

THE IRON AGE

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Contents — January 28, 1937

"It Can't Happen Here"	17
Arc Refined Stainless Steel	18
Industrial Power Transmission	24
Progress in Forming and Forging	26
New Steel Mill Plant Capacity	32
New Equipment	38
Automotive Industry	42
Statistics on Metal-Working Activity	46
Rate of Activity in Capital Goods	47
Washington News	48
NEWS CONTENTS	58
Plant Expansion and Equipment Buying	96

▼ ▼ ▼

New Industrial Literature	12
Just Between Us Two	107
Products Index	105
Index to Advertisers	130

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... THE IRON AGE ...

JANUARY 28, 1937

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"It Can't Happen Here"—

WE realize that it is not altogether fashionable today to respect one's elders, but common sense should tell us that we might, at least, learn something from their experience.

Take England for example. She has had plenty of experience with labor troubles. England has been a unionized country for nearly a century and a half. England has also had a labor government, which is something that we have not as yet experienced.

England also has had something that we have not yet had, but which we are rapidly approaching in effect, and that is a general strike. It occurred there in 1926.

The British public is reputedly phlegmatic in temperament and slow to wrath. It is not as volatile as the American public. But history shows us clearly that the British public recognizes when its corns are trod upon; not only recognizes it, but takes care that the offense shall not be repeated.

Thus, when the general strike occurred, the phlegmatic British public suffered the inconveniences which fell upon it in silence. It took the brunt of the punishment that the antagonists attempted to inflict upon each other. But it started to think. It said to itself: "Why should the great British public, which owns the bath tub, permit minorities to wash their dirty linen in it?"

So the British public, slow to wrath but sure to insist upon justice, got busy. It secured an amendment to the British Trades Union Act on July 29, 1927. Under this amendment, what is now happening here, to the detriment of the American public, could not happen.

For example, a handful of "sit-down" strikers and their pugnacious allies outside the plant could not keep six or seven times their number of fellow workmen from exercising the right to work. For the British Trades Union Act specifies that:

It is hereby declared that it is unlawful for one or more persons . . . to attend at or near a house or place where a person resides or works . . . for the purpose of . . . persuading any person to work or abstain from working, if they so attend in such manner as to . . . intimidate any person in that house or place . . . or to obstruct the approach thereto or therefrom . . .

In other words, if Mr. John Lewis and his cohorts of the C.I.O. were practicing their present-day American tactics in the good old unionized country of England, they would be given what is known in the American vernacular as the "bum's rush."

We can still learn something from our mother country.





Arc Refined

By T. W. LIPPERT

Metallurgical Editor, The Iron Age



THE story of stainless steel is a twentieth-century saga of detailed research, of unremitting effort to improve quality and/or reduce costs. Each metallurgical innovation in the past has placed stainless alloys in new applications—each 1c. drop in price has boosted output to a startling degree. Thus, with a lucrative and unplumbed future market dangling before their eyes, it is then small wonder that at times

¹ Conventional means the use of Heroult, Lectromelt, Swindell and Snyder direct-arc furnaces, and Ajax-Northrup and Röchling-Rodenhauser induction furnaces. For producing corrosion and heat-resisting castings, the relative installed hourly capacities are estimated as follows: Heroult (and Swindell and Snyder), 26,500 lb.; Lectromelt, 25,500 lb.; Ajax (high frequency) and Röchling (low frequency), 18,300 lb. Relative production varies widely from these capacity figures.

² Refers to the hollow-electrode furnace herein described, and the proprietary practice of Rustless Iron & Steel Corp.

³ Bethlehem's top-fired Simpson unit and Barium Steel Corp.'s Bosshardt furnace. The former shows considerable promise—it uses chrome ore and is thus direct reducing.

steel makers have forsaken conventional furnace production¹ in favor of direct-reduction ventures² to improve quality or to offset the continued high cost of raw materials, or of open-hearth processes³ designed to reduce costs of power and charge or speed up production. These later practices naturally involve more highly skilled supervision, but are justified as methods of avoiding the relative high cost of low-carbon ferrochrome; however, if the ferrochrome price were to be dropped, say, 5c. a lb., the author ventures that many direct-reduction experiments would languish.

With a high percentage of current stainless alloy tonnage confined to sheet and bar stock, contemporary research has perforce been lavished on the nuances of ingot metallurgy. A closely related industry, castings, often has been slighted, mostly because the attractive tonnage potentialities frequently are not duly recognized.

The market today for stainless and heat-resisting castings is booming (exactly how booming, only the Alloy Casting Association, Inc., knows—it won't tell), and even cursory inquiry will disclose many a consumer prepared to switch to stainless castings when

and if prices become attractive, or when physical properties, surface finish and corrosion-resistant properties *in toto* meet his finicky specifications. But, like many another apparently attractive picture, the aforesaid is not the complete story. Many a small or inexperienced founder in the past has embarked upon the production of chrome and chrome-nickel castings, only to ruefully discover that to meet specifications requires the application of an ingenious metallurgy and a skilled molding technique, that off-heats of expensive metal can wipe out profits instantaneously or a high percentage of floor rejections often can do the same thing even if the analysis is on the button, and that many customers can and do develop a peculiarly vicious brand of meanness with regard to hard spots, surface porosity, sand pits, or poor machineability.

Every commercial alloy foundry has had discouraging encounters with each and all of the foregoing difficulties. Similar experiences were at first the lot of the Buffalo foundry division of the Ludlum Steel Co., but subsequent research over the past year has indicated that the proprietary and radical hollow-electrode type of electric melting and refining fur-

STAINLESS STEEL CASTINGS

nace is peculiarly adapted to the production of chrome and chrome-nickel steels for castings. Innumerable castings of different analyses and designs already have been turned out in a production manner and subjected to exhaustive tests, not only in the laboratory but also in consumers' plants. Conclusive proof thus has been assembled that this unique refining unit can and does turn out stainless and heat-resistant steel castings covering a wide range of closely controllable analyses, having exceptionally excellent mechanical and machining characteristics, unusual freedom from porosity, more than adequate corrosion resistance in all normal applications, and generally of such quality as to fully meet the diversified demands which have grown up around stainless and heat-resisting castings as a whole.

Such broad claims for castings must necessarily be given detailed attention. And this attention involves some consideration of the furnace itself; for only by examining its mode of operation can the results obtained be rationalized.

The Furnace

As conceived, the hollow-electrode furnace was believed to be what the industry had long awaited, a cheap producer of high-grade stainless alloys for sheet and bar stock. A two-electrode two-ton unit ably turned out many batches of metal having certain very desirable characteristics. However, most observers judged its operation uneconomical, in view of the skilled supervision necessary, the refractory destruction arising

A PIONEER in electric furnace steel in 1910, a pioneer again in stainless alloys during 1919, Ludlum Steel Co. is now pioneering for the third time; using the proprietary and unique hollow-electrode furnace, a recently created foundry division is setting new standards for stainless castings. What Ludlum has done in 15 months of quiet preparatory research is herein set forth for the first time.

from the high temperatures involved, and the complex electrode arrangement, i.e., electrodes must be drilled, cores prepared and provision made for slowly turning the electrodes and at the same time effect a continuous and fully controllable passage of the cores through the hollow electrode. Seeking to improve economy, a 10-ton 6-electrode unit was constructed about a year ago, but even though satisfactory ingot alloy was produced it likewise proved uneconomical. Attention was then redirected to a slightly modified 3-ton 2-electrode unit, and its forte as a producer of stainless alloys for castings soon was demonstrated.

The furnace now used is an indirect-arc single-phase type, with two 10-in. graphite electrodes, which are hollow (4½ in. coaxial hole) and rotate slowly to insure even wear (one turn each 27 min.).

The shape of the furnace is shown in the photo on the accompanying insert; the electrodes project through the ends at a slight angle to the horizontal, to facilitate the flow of reagent from the ends of the hollow electrodes and to direct the full arc heat on the bath. The bath is not a part of the arc circuit (unlike the Heroult furnace).

Cores (or briquettes) are made on a simple screw extruding machine and subsequently baked to eliminate moisture. An hour's work by one man suffices to produce a week's supply. The core composition is in the ratio of 14 lb. of coke, 100 lb. of chrome ore and 3 lb. of a binder such as molasses. Each core is 30 in. long and slightly under 4½ in. in diameter, so that they will pass with ease, end to end, through the hollow electrode. Feeding, at the cold end of each electrode, is accomplished by means of a variable speed, continuous loop chain arrangement supplied with pusher lugs at 31-in. intervals. The entire furnace tilts about the axes of the electrodes so that they need not be disturbed during tapping.

The furnace is essentially dualistic in operation. The arcing electrodes melt the scrap charged on the hearth and, unlike usual practice, the initial carbon content of the bath is of little moment. Chrome-ore-carbon briquettes are slowly fed through the electrodes where, as they approach the arc tip, they are smelted at the extremely high arc temperature. The resulting ferrochrome (which contains a substantial amount of chromium oxide in solution) is violently sprayed continuously throughout the bath, the net result

being a continuous build-up of chromium and simultaneous oxidation of carbon, silicon, manganese and other oxidizable impurities from the bath. A by-product of the smelting action is the liberation of carbon monoxide (and

roofs have been moderately long lived, or at least they last as long as silica roofs on those conventional furnaces which are habitually run very hot to speed up reactions or secure certain metal characteristics.



FIG. 1.—Cream separator bowl made to standard 18-8 analysis. On the left is the casting just as it came from the sand. The two center ones have had feeder and riser portions removed and have been sand blasted. The sectioned casting on the right has been polished after sand blasting only, without an intermediate machining operation.

some CO_2) thus furnishing the furnace with a continuous reducing atmosphere throughout, a condition difficult to duplicate in a standard arc furnace.

This refining action can, perhaps, be better visualized if consideration is given to conventional production in a Heroult furnace. Low-phos steel scrap is melted, scale or iron ore is added, and carbon and other elements are removed by an oxidizing slag. Pig nickel is added and melted, the oxidizing slag is removed and a finishing slag added. Chrome is built up by additions of low-carbon ferrochrome, final deoxidization additions are made, and the heat is tapped as quickly as possible to avoid expensive chrome losses.

Being a direct-reduction process, the hollow-electrode furnace necessarily operates at quite a high temperature, usually in the neighborhood of 3400 deg. F. Thus, refractory wear is severe, but Kromag

⁴ Low-phos steel scrap could be used for the entire charge. However, despite a constantly rising price level, 18 and 8 scrap still is the most economical source of nickel and chromium. The primary function of the hollow-electrode furnace is to melt and refine the charge, not to act as the only source of chrome and build the analysis up from, say, zero.

⁵ Somewhat higher than the power input of conventional furnaces. Reason: The furnace is smelting ore as well as melting and refining the bath.

Concerning the time and power requirements of the hollow-electrode furnace, consider an actual 18 and 8 heat. About 2000 lb. of ordinary and stainless scrap⁴ is charged cold. With the arc on and cores feeding, the charge is melted in about 50 min., at which time the metal on snap test may analyze 0.44 C, 17.4 Cr, and 10.08 Ni. Two hours later, the metal is tapped, with a final analysis of 0.075 C, 18.54 Cr and 9.67 Ni. Note the drastic carbon reduction with concomitant elevation of chrome. Power consumption is about 1000 kw-hr. or slightly higher.⁵

The Metal

In judging the value of the hollow-electrode furnace as a producer of stainless alloys, consider first its ability to turn out metal of definite and easily controllable analysis. Carbon content is constantly reduced, often to below 0.03 per cent, and recarburization to meet a specification is routine procedure (compare with most foundries' unwillingness to go much below 0.25 per cent, arising from refining difficulties and reluctance to loose fluidity), and at the same time chromium is being maintained at a definite level or being built up without any difficulty. Since both

silicon and manganese are reduced with the carbon, it is customary to recharge definite amounts of the former two elements to obtain higher fluidity for pouring thin-sectioned castings.

Practically all alloy specifications containing 10 per cent or more of chrome are produced in the hollow-electrode furnace, the principal types being as follows:

Chrome Per Cent	Nickel Per Cent
18	8
20	10
18	0.5
18	2
12	2
25	12
25	20
15	35

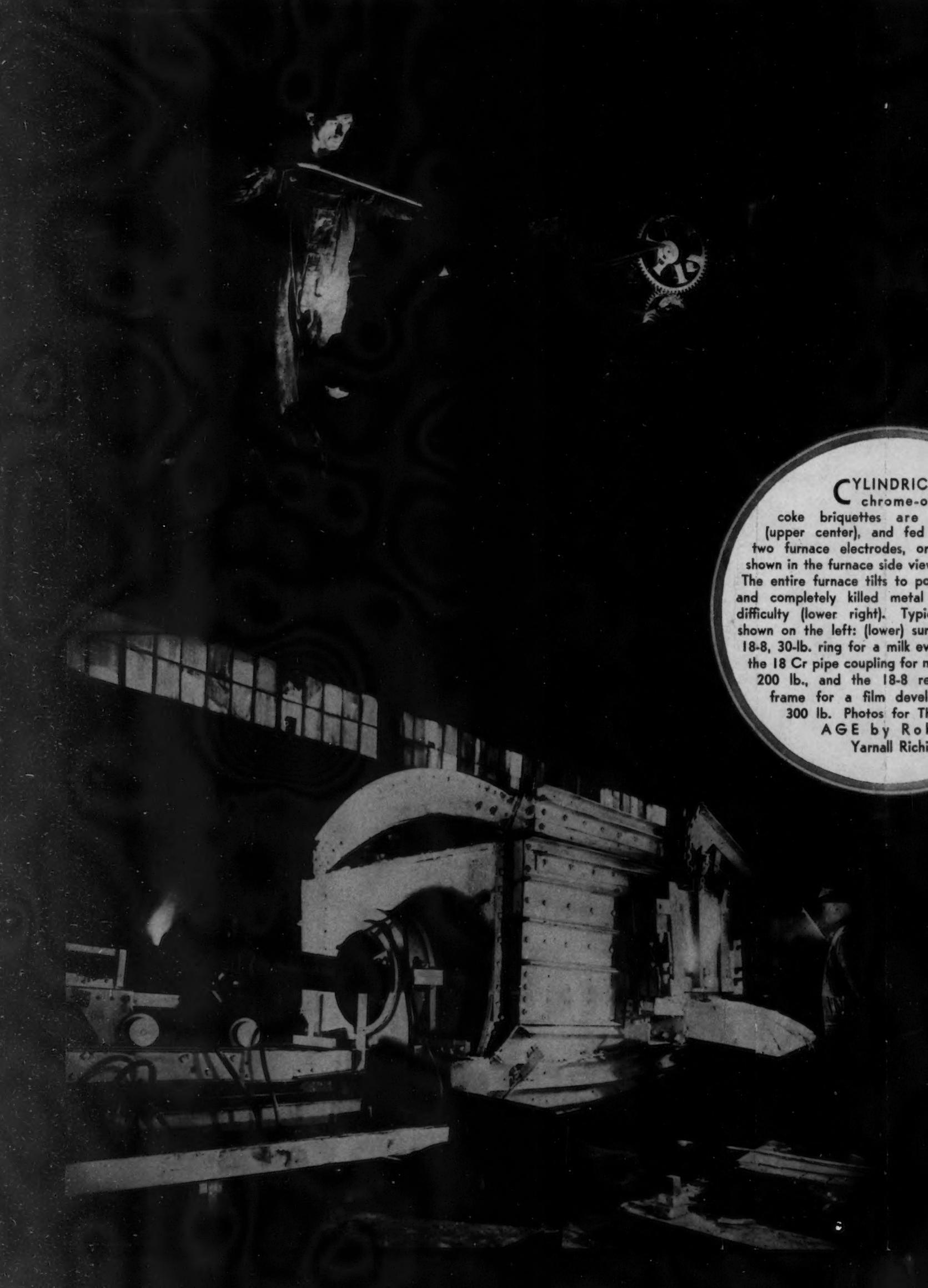
All of these analyses are made below the average in carbon content, that is, in contrast to general casting procedures in the trade. A typical heat might give a final analysis of 0.29 C, 0.22 Si, 16.6 Cr and 35.2 Ni; in the particular melt observed by the author, the carbon was dropped from 0.29 to 0.10 per cent in 15 min., and it was necessary to recarburize the bath for final pouring. Another trial heat had a final analysis of 0.09 C, 0.20 Si, 19.8 Cr and 11.3 Ni; the carbon content declined from 0.37 per cent to the final 0.05 figure in 20 min.

Fluidity-Porosity

The maker of rolled stainless steel is not much concerned with fluidity inasmuch as to cast in an ingot is a comparatively simple operation. By the same token, surface porosity, scabbing, etc., although abhorred, do not mean the scrapping of a heat. To the foundryman, however, each and every one of these tendencies is momentous. Metal must go chasing around in the mold, fill up large spaces and solidify perfectly in thin sections, consequently fluidity is essential to avoid cold-shuts and mis-runs. And metal must be gas free, otherwise internal porosity and piping will result. And surfaces must be relatively free from porosity or scabbing; for a casting is essentially a finished product and can stand little chipping, machining, etc.

To meet these problems, usual foundry practice is to increase carbon to effect better fluidity. Likewise, the metal is often pretty well dosed with deoxidizers to pro-

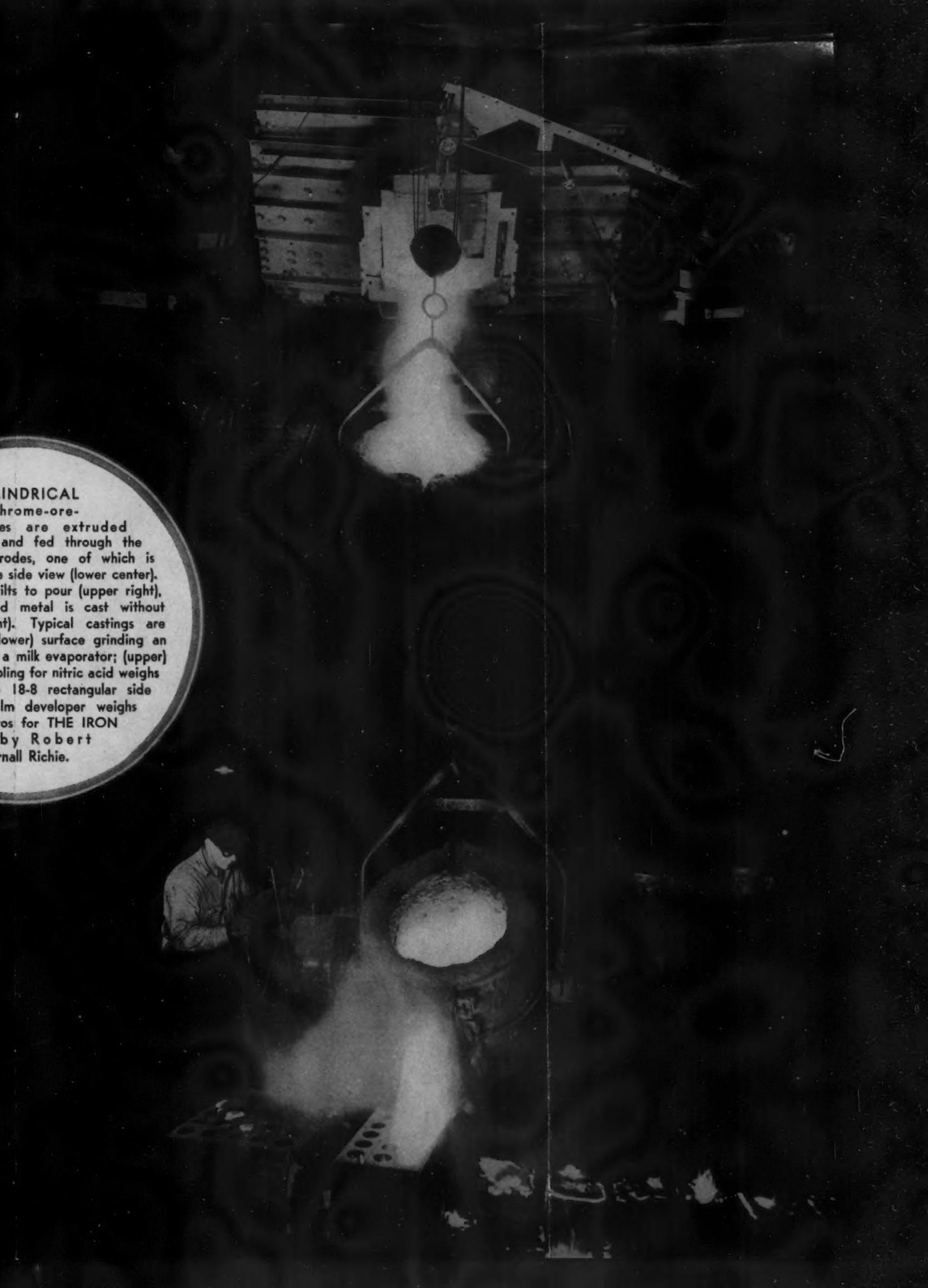




CYLINDRIC
chrome-o

coke briquettes are
(upper center), and fed
two furnace electrodes, or
shown in the furnace side view.
The entire furnace tilts to po
and completely killed metal
difficulty (lower right). Typi
shown on the left: (lower) sur
18-8, 30-lb. ring for a milk ev
the 18 Cr pipe coupling for m
200 lb., and the 18-8 re
frame for a film devel
300 lb. Photos for Th
AGE by Rol
Yarnall Richi

INDRICAL
hrome-ore-
es are extruded
and fed through the
rodes, one of which is
side view (lower center).
tilts to pour (upper right),
d metal is cast without
t). Typical castings are
(lower) surface grinding an
a milk evaporator; (upper)
oling for nitric acid weighs
18-8 rectangular side
lm developer weighs
os for THE IRON
by Robert
nall Richie.





duce metal as gas free as possible.

Metal from the hollow-electrode furnace need not be so treated. Carbon can be as low as desired, and no final deoxidization is necessary for the metal is constantly refined in a reducing atmosphere⁶; also, the FeO concentration dissolved in the melt is extremely low. In fact, the metal as it lies in the ladle is killed dead, deader (sic) than any alloy the writer has seen, and is comparable to molten lead. And, oddly, the metal seems to pick up no life even during pouring. High pouring temperatures are easily maintained and, inasmuch as the fluidity is high and metal is gas free, the usual ranges of chrome and chrome-nickel alloys pour quietly and give castings which are exceptionally clean and free from porosity.

High pouring temperatures—and the hollow-electrode metal pours at a very high temperature—are usually considered undesirable in view of the peculiar scouring or cutting characteristics of these molten alloys, which severe-

⁶ Which seemingly belies the accepted fact that CO dissolves in large quantities in molten steel and is subsequently liberated at a lower temperature to give rise to blow holes and other defects. Alloy steel in the hollow-electrode furnace has maximum opportunity to pick up CO, inasmuch as the atmosphere is 100 per cent CO and the metal far above the melting point. But if moisture enters the furnace (say some damp fluorspar), it has been found that hydrogen becomes available and gassiness ensues. Thus, hydrogen (hydrides of some sort) may be the guilty party.

ly tax the bond and cohesion of the molding sand, thereby resulting in surface and internal porosity. However, the author witnessed many castings poured at Buffalo, both simple and very complicated shapes, and subsequent examination showed little or no porosity or surface imperfection. Probably the lack of gas evolution was a decided compensating factor.

The Buffalo foundry employs conventional sand mold practice; molds are baked or skin dried as necessary. Because the metal is so completely gas free, it has been found essential for good results to increase the size of feeders and risers on castings. An example of feeder and riser practice is shown in Fig. 1; this particular casting is known as a cream separator bowl, made to standard 18 and 8 analysis. Note the clean surface as-sand-blasted, and how the metal takes a high polish without intermediate machining.

A group of castings, shown in the insert, demonstrate the good surface obtainable on large castings, having both thin and heavy sections. A group of small castings, including an 18-8 chain, is shown in Fig. 2.

Machineability

The machining of martensitic, ferritic and austenitic stainless and heat-resisting steels must be

carried out more slowly than for ordinary steels, and is complicated by high frictional qualities, brittleness under impact, great toughness or hardening under cold work. To improve the machining qualities (of, say, 18 and 8), the usual procedures are to dose the metal liberally with selenium and phosphorus or combinations thereof, or sulphur, which lessens the frictional effect.

After many tests, the metal from the hollow-electrode furnace has shown consistent excellent machining characteristics, usually on a par with bar stock containing sulphur or selenium. Ludlum attributes this free machining characteristic to the presence of certain inclusions in the alloy, which arise from the dispersion of chromium oxide by the hollow electrodes throughout the base metal. This view is checked by the immediate drop in machining ability as soon as the inclusions are reduced and removed by the usual slag and deoxidizing methods. For this reason the inclusions are usually retained, particularly in view of the fact that they have been found to materially affect corrosion resistance and, also, possess some ductility under the forging hammer.

The inclusions most prominent are (a) the brittle, refractory non-malleable chrome oxide Cr_2O_3 ; (b) silicates sometimes entrapping iron sulphide, which type of segregate

FIG. 2.—These castings, made from hollow-electrode metal, have received no treatment other than sand blasting. The 18-ft. cast chain is of 18-8 stainless, the decorative plaque is 18-8, the sectioned diesel piston head is 18-30, the six small clamps are 18-8 (10 oz. each), and the two boiler feed valves are 18 and 8.

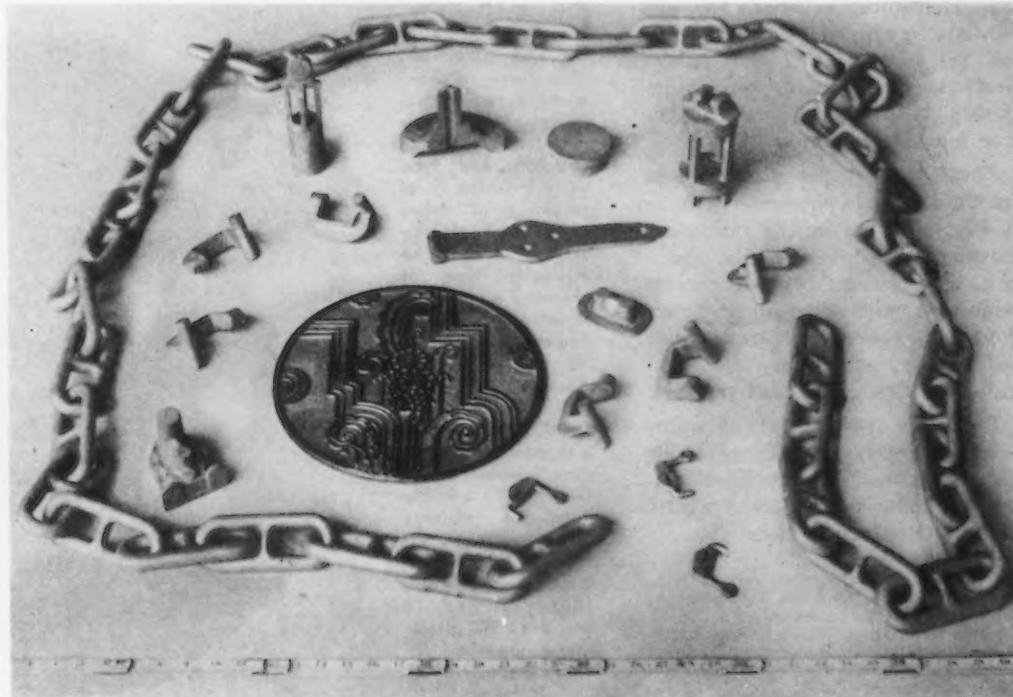


TABLE I
Machining Tests on Stainless Steel Melted and Refined in the Hollow-Electrode Furnace

Steel Analysis				Machining Operation	Surface				Remarks
C	Cr	Ni	State		Type Tool	Ft. Per Min.	Feed	Depth of Cut	
0.17	18.04	7.64	as-cast	turning	18-4-1 HS.	140	1 1/4 in. per min.	0.06 in.	Surface smooth. No porosity or sand spots. Tool OK.
0.11	18.88	7.64	as-cast	turning	7% Co. HS.	127	0.015 in.	0.025 in.	Surface good. No porosity. No sand holes. Tool OK.
0.11	18.88	7.64	as-cast	drilling	H.S. 1/2-in. Rd.	55	1 1/8 in. per min.	.....	Drill OK. Surface holes smooth. Clean. No porosity, no sand holes.
0.17	18.66	8.07	as-cast	turning	7% Co. HS.	104	0.010 in.	0.013 in.	Surface good. No porosity. No sand holes. Tool OK.
0.17	18.66	8.07	as-cast	drilling	H.S. 1/2-in. Rd.	55	1 1/8 in. per min.	.....	Drill OK. Surface hole smooth, clean. No porosity. No sand holes.
0.19	19.01	29.29	as-cast	turning	18-4-1 HS.	69	0.030 in.	1/16 in.	Tool OK. Finish good. No porosity. No sand holes.
0.19	19.01	29.29	as-forged	turning	18-4-1 HS.	76	0.020 in.	3/64 in.	Tool OK. Finish good. No porosity.
0.11	19.68	9.99	as-cast	turning	18-4-1 HS.	69	0.005 in.	1/32 in.	Tool OK. Finish good. No porosity. No sand holes.
0.11	19.68	9.99	as-forged	turning	18-4-1 HS.	107	0.030 in.	1/16 in.	Tool OK. Finish smooth. No porosity.

possesses good malleability at forging temperatures, and often tend to form envelopes around dendritic areas, especially near the feeder points of the castings; and (c) another type of chrome oxide not precisely identified as to exact composition, which is somewhat ductile at forging temperatures and reacts quickly to H_2SO_4 . In ordinary stainless alloy melted in a conventional manner, the inclusions found are usually a combination of FeO , Cr_2O_3 , SiO_2 , and sometimes Al_2O associated with the various oxides. The source of the inclusions is the slight oxidation of metal during tapping and pouring. Therefore, inclusions (a) and (b) are generic in character, but (c) is typical of the hollow-electrode metal, and to this inclusion is credited much of the free machining ability.

These three types of inclusions are shown in the photomicrographs in Fig. 3. Note in the one view, showing a forged 18 and 8 specimen, how the one type of chrome oxide (c) and the silicates are elongated, thereby showing their malleability, and how the non-malleable Cr_2O_3 is unaffected.

Tests for iron oxide (as unassociated FeO), manganese oxide and manganese sulphide have generally produced negative results for hollow-electrode metal.

⁷This complex chrome oxide has been detected in German ferrochrome furnaces and, the author believes, it has also been found in metal produced by Rustless Iron & Steel Corp. Thus, it apparently arises from the reduction of the chrome ore.

The results of a number of machining tests are tabulated in Table I. Note that the speeds obtained are quite high. Physical characteristics of these same analyses are quite favorable, both for as-cast and forged metal. See Table II.

Corrosion Resistance

As previously mentioned, quantities of chrome oxides are often left in the metal to facilitate machining, and tests have shown that these oxides in most cases exert no deleterious effect on atmospheric corrosion resistance.

Various samples, including 18-8, 20-10, 16-18 Cr, and 20-30 Cr-Ni, as-cast, heat-treated and forged, all have been subjected to 20 per cent sea salt spray tests at room temperature for periods up to 72 hr. and have shown excellent resistance. Similar samples exposed to atmospheric attack in the vicinity of the Ludlum plant at Watervliet, N. Y., have shown no rusting, pitting or anodic type of corrosive attack after 13 months' time.

A 19 Cr-39 Ni-0.19 C alloy, refined in the hollow-electrode fur-

FIG. 3.—(Left) As-cast condition of 18 and 8 at 500 diameters; etchant is aqua regia glycérine; this view shows the average structure and type of inclusion, of which three types are present, chrome oxide Cr_2O_3 , the malleable type of chrome oxide, and silicates. (Center) As-cast condition of 18 and 8 at 500 diameters, etched with H_2SO_4 plus $KMnO_4$, and washed with oxalic acid, to show chrome oxide Cr_2O_3 . Malleable type of chrome oxide has been attacked by etchant and eaten out. (Right) Forged 18 and 8 at 500 diameters, unetched to show dispersion of inclusions.

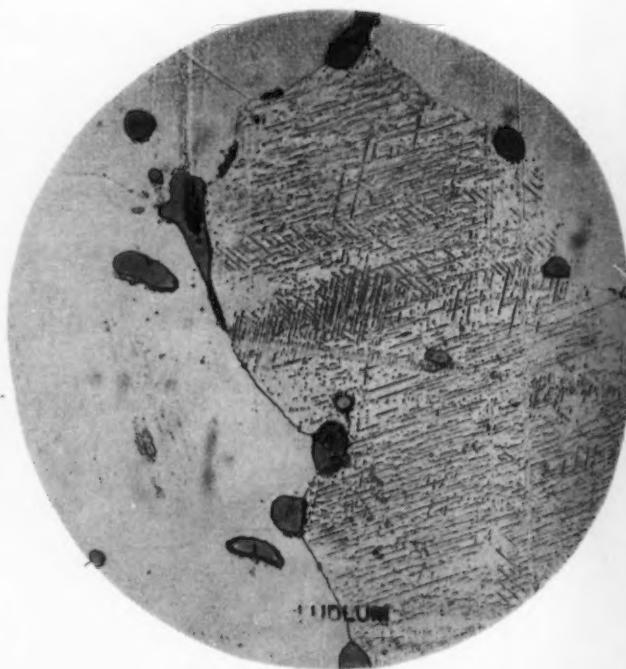


TABLE II
Tensile Tests for Castings of Stainless Steel Made in the Hollow-Electrode Furnace

Steel Analysis			State of Metal	Temp. of Test, Deg. F.	Proportional Limit, Lb. Per Sq. In.		Yield Point, Lb. Per Sq. In.	Tensile Strength, Lb. Per Sq. In.	Elongation, Per Cent Red. of Area			Brinell Hardness
C	Cr	Ni			Lb. Per Sq. In.	Lb. Per Sq. In.			in 2 In.	Per Cent	...	
0.17	18.04	7.64	as-cast	70	22,500	31,500	36,500	3.5	15.2	159	...	
0.18	19.01	29.29	as-cast	70	20,000	29,000	67,250	20.5	22.3	131	...	
0.18	19.01	29.29	as-cast	1700	.....	16,150	16,850	19.0	26.4	...	...
0.11	19.68	9.90	as-cast	70	12,500	26,500	69,500	41.0	37.2	140	...	
0.18	19.01	29.29	forged	70	13,500	53,500	93,500	22.0	17.7	207	...	
0.18	19.01	29.29	forged	1700	.....	.....	22,750	16.0	45.4	...	...
0.11	19.68	9.99	forged	70	52,500	71,000	97,000	38.5	49.1	196	...	
0.11	19.68	9.99	forged and treated at 1850 deg. F. and air cooled	70	16,000	31,500	84,750	53.0	57.0	...	...

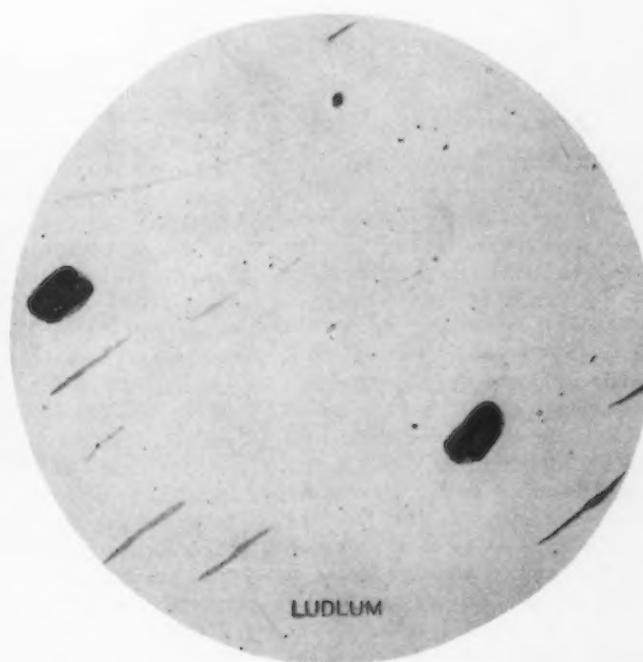
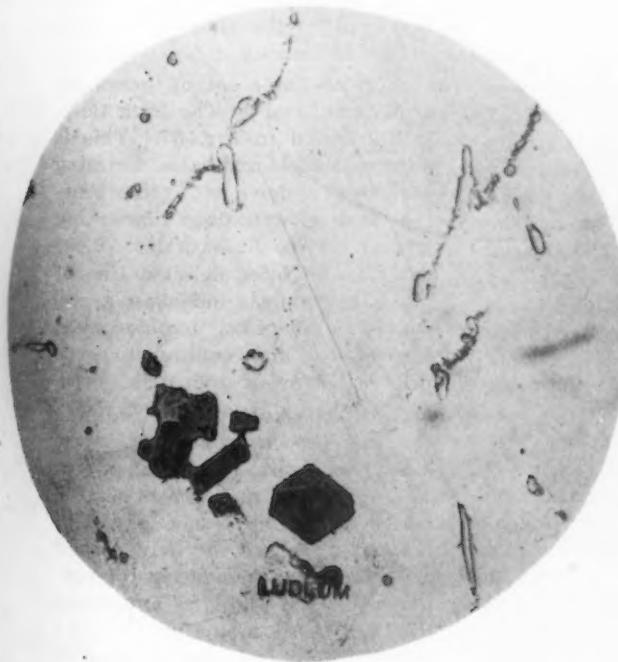
nace, has been tested in the as-cast state in 25 per cent H_2SO_4 , at 160 deg. F., and after 152 hr. the weight loss amounted to 0.00370 gram per sq. in. Another type of steel (KA2-S, a Ludlum analysis), made in a standard electric arc type of furnace and hot rolled in the conventional manner was completely dissolved in 130 hr. in a similar test, showing a weight loss of 0.06889 gram per sq. in. A similar analysis made in the hollow-electrode furnace, in the as-cast condition and containing considerable amounts of oxides of chromium, was completely dissolved in 25 hr. with a weight loss of 0.51966 gram per sq. in. This indicates that this

particular analysis suffers somewhat from the retention of oxides.

Intergranular corrosion tests, using $CuSO_4$ plus H_2SO_4 solution, have demonstrated that the 18-8 types of steel made in the hollow-electrode furnace are about equal to commercial 18-8 hot-rolled or forged, provided that the castings are given heat treatments, usually air or water quenching from 1850 to 1950 deg. F. Mixed acid corrosion tests, using the H_2SO_4 plus HNO_3 mixtures commonly employed, tend to show that the 18-8 types made in the hollow-electrode furnace are best after being heat treated, although it has been found that initial attack, that is, during

the first hour of test, on samples in the as-cast condition, was generally much less pronounced than in the case of 18-8 or other stainless steels made in the usual type of electric arc furnace and hot forged and rolled to shape.

So far, there has been little opportunity to garner many results of actual service applications of hollow-electrode metal. However, one customer has reported that after 74 days in 63 per cent nitric acid, during which time approximately 2,500,000 lb. of acid has flowed over it, the castings (18 and 8) show no loss in weight, nor has there been any indication of a change in structure.



POWER TRANSMISSION

Better belting technique and advances in electrification mark power transmission progress. This is the third and concluding part of the article in the issues of Jan. 7 and Jan. 21.

By FRANCIS JURASCHEK
Consulting Editor, The Iron Age

CONDOR V-belts, made by Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Inc., have a cord section in the neutral axis composed of heavy strands of cotton impregnated with a strong, tenacious, slow-aging rubber friction compound, producing a homogeneous, inseparable unit with great strength, durability and flexibility. The useful life of a V-belt under normal conditions being limited by excessive stretch, the fact that the new Condor V-belts have shown in repeated and exhaustive tests a stretch of only 1.6 per cent to 1.9 per cent of their length insures long and useful life. A typical in-

stallation of these belts on a large lathe drive is shown in Fig. 35.

The combination of V-belt drives and pivoted motor bases has been further improved by the Rockwood Mfg. Co., on the theory that V-belts and pivoted motor bases naturally belong together and should be so designed and installed as to take the utmost advantage of the natural benefits which each are capable of producing. In maintaining constant tension on the belts during operating periods, and removing tension from them when the drive is idle, the life of the belts is conserved. Likewise in properly proportioning the belts to the drive the greatest possible advantage may be taken of the constant tension feature of the pivoted motor base, so that smooth operation results. A typical example of a unit-designed Rockwood V-belt drive and Rockwood pivoted motor base is shown

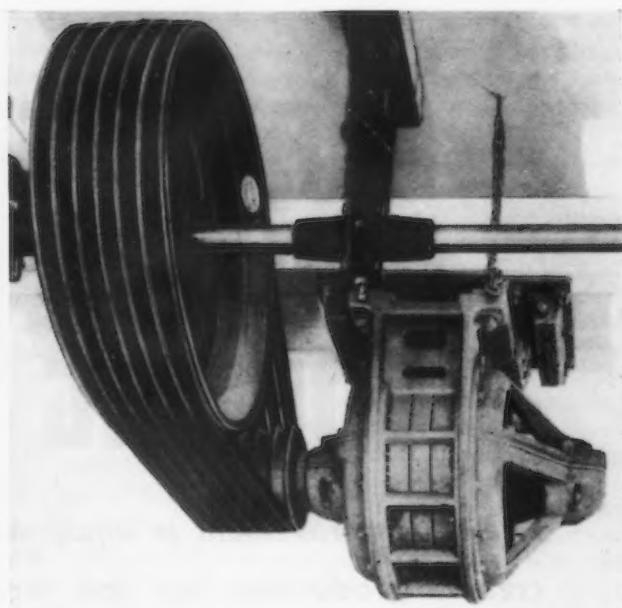
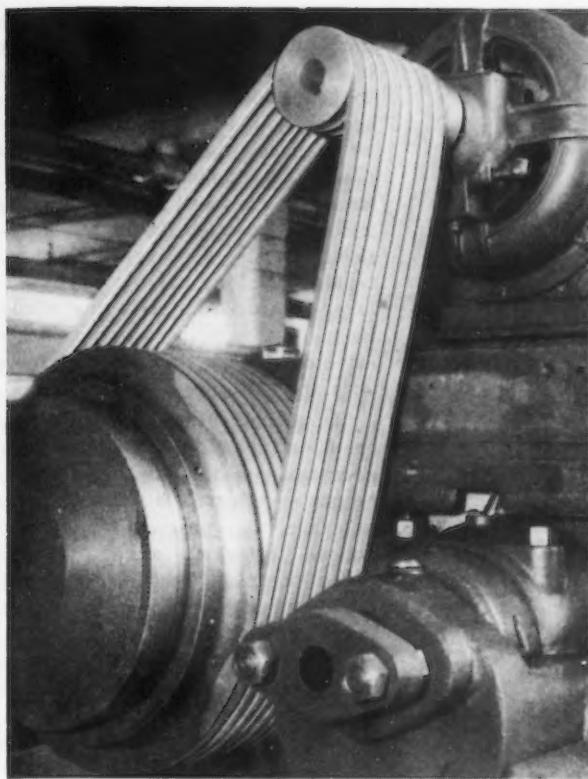
in Fig. 36, where the motor is mounted on a ceiling beam and the shaft supported by a nearby hanger.

Gears and Couplings

Link-Belt Co. announces a new line of worm gear reducers of simple, compact, accessible construction, offering great flexibility of driving arrangement. These new reducers are made in a wide range of ratios and capacities, with single or double reduction and in horizontal and vertical types, all provided with precision tapered roller bearings and automatic lubrication within dust-proof gray iron housing. The output shaft with its chilled phosphor bronze worm wheel can be located above or below the worm shaft, which is made of a low-carbon alloy-steel forging, carburized and heat-treated after the worm threads have been cut thereon. A feature of the double reduction reducer is the unitized attachment of the primary reduction unit to the side of the final reduction housing.

A remarkable set of gears recently produced by The Falk Corp. is illustrated in Fig. 37. This is a huge double reduction finishing scalebreaker drive with roller bearings and self-contained lubricating system. Falk Bulletin No. 10,000 describes in brief detail a line of precision products including gears, speed reducers, motoreducers, heavy drives and couplings to serve practically every industrial need.

A unique universal self-aligning coupling especially adapted where difficulties arise in the alignment of the driving and driven shafts, where alignment is not positively assured or where the driving and driven member foundations or supports are not rigid, is announced by the Harris Coupling Co. As shown in Fig. 38, the coupling is



ABOVE

FIG. 36—A typical Rockwood V-belt and Rockwood pivoted motor base combination.

AT LEFT

FIG. 35—Manhattan Rubber's Condor V-belts driving a large lathe.

designed to allow parallel misalignment or displacement of $3/16$ in. between both shafts, and 15 deg. angular displacement between them, or both together. The interior members of the coupling are so designed and arranged that the gravitational or centrifugal forces

between the driving and driven members in relation one to the other are eliminated. This design removes the lateral thrust on both shafts and their bearings, and allows free compensating of both shafts anywhere within the specified limits. Thus there are no losses

caused by or through misalignment even where such misalignment is large, either parallel or angular; no vibration either in or out of alignment at high or low speeds; functional parts are protected from abrasive substances which may enter

(CONTINUED ON PAGE 100)

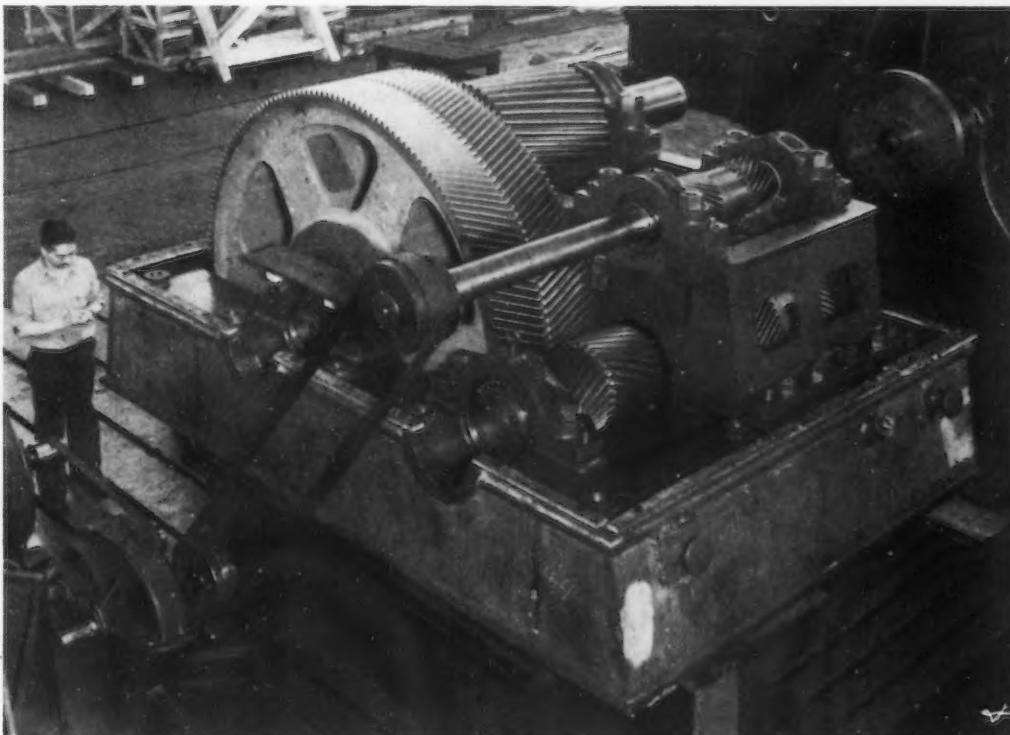


FIG. 37—Falk double reduction finishing scalebreaker drive for steel mill.

FORMING AND FORGING

Marked improvement in equipment, increased production rate and increased precision of product characterize the year's developments in forging. This is the concluding part of the article which appeared in The Iron Age of Jan. 7.

By F. L. PRENTISS

Cleveland Editor, The Iron Age

HTHE parts above* mentioned are forged to very close dimensions, normalized, cleaned, and coined to the desired shape and size, leaving the outer surface smooth and clean for the case hardening operation or any hardening treatment that is desired. All this is accomplished by the use of intricate dies and punches so placed within a coining press of the proper size. This press shapes, slots and sizes such parts at the rate of 30 to 100 per hr. In many cases, one hundred or more are finished by the time one part could be machined by the regular method; thereby making a saving which is as outstanding as any automatic machine production.

Furthermore, by the use of the coining press many designs are permissible which otherwise would be impossible to use, due to the prohibitive cost of production. To

finish these parts the drilling and broaching of the central section are the only operations required. All dimensions are pressed to within the limits of plus or minus 0.005 in. or limits which are not so exact. These facts should not be overlooked by the industry, for such applications fit very nicely into the mass production scheme."

Summarizing the advances in the forging industry, R. H. Jones, National Machinery Co., Tiffin, Ohio, says:

"During 1936 the trend in the forging industry and in forging machine design has been towards the same ultimate goal—low weight, close limit forgings that are more nearly the desired final size and shape. Much progress toward this end has already been made, and the resulting savings have been so marked that continued effort along this line is to be expected."

The modern high-duty forging machine built by this company has a short compact under-slung steel

frame which is reinforced with large diameter tie bars. This type of frame has an extremely low factor of spring underload and consequently, it is stated, the dies stay fully closed during the action of the heading tools on the hot stock, resulting in well filled forgings without excessive flash. Die alignment has also been given close attention, the long narrow pilot over-arm heading and gripping slides insuring, it is pointed out, accurate registration of the heading tools with the gripping dies.

"Displacement piercing of deep holes and punching and trimming operations in this machine are no longer considered stunts but are now accepted practice," says Mr. Jones. "Forgings are now produced complete with holes ready for broaching. There are no part lined fins to trim off and, in fact, many forgings produced on this modern machine are made without flash at any point, thus eliminating all subsequent trimming operations. Considering that every pound of material trimmed off a forging as a flash, and drilled out of a hole or machined off elsewhere as excess finish represents expensive material that must be carried in the inventory, must be handled to and from the forge shop, must be heated and forged and consequently must carry the same overhead as the forging itself and its ultimate value is only as the cheapest kind of scrap, it is obvious that low weight, minimum finish forgings and the equipment that makes them possible are economic necessities."

The "Maxipress"

A comparatively recent addition to modern forging equipment is the vertical Maxipress made by the National Machinery Co. This was developed to coin forgings produced on the high-duty forging machines and brings the forgings still closer to the finished size. The forgings are made ready for high production chucking machines and grinders on this press.

Expensive straightening and "hogging off" operations to get the forgings to fit finishing jigs are eliminated, Mr. Jones points out. This type of work requires extreme rigidity and accuracy of alignment. The machine has a steel bed reinforced with large diameter shrunk-in tie bars. The ram is of the long piloted over-arm type. The pitman is direct connected, the

* This is continuation of remarks by A. C. Johnson, president, Rockford Drop Forge Co., from Jan. 7 issue, page 367.

shut height adjustment being taken care of by a large wedge on the lower die seat. The shaft is unusually large in diameter and is of the full eccentric type. This construction, it is stated, results in freedom from spring and insures extreme accuracy of die registration.

Making mention of the ever-present demand for machines that will increase production, Mr. Jones states that additional progress in this direction has been made by the development of the high-duty forging machine and Maxipress. The new air-operated friction clutch, which is incorporated in both machines, he states, results in almost instantaneous starting. Longer life is claimed for the wearing parts because of the elimination of shock and jar through the use of this type of clutch. Consequently there is less time down for repairs and adjustment. The friction air clutch on both machines is made oversize so that the plates

will not slip if the machine is overloaded. The Maxipress has quick and positive ejection and both machines are arranged for convenient feeding.

Grain Flow

Buyers of forgings are paying more attention to structure and grain flow and some, particularly in the automotive field, are now furnishing samples or sketches indicating the grain flow they desire, states H. N. Anderson, sales manager, Acme Machinery Co., Cleveland. Railroads are using more forgings for locomotive and car parts and there is a trend in the same direction by makers of agricultural implements, he reports.

More forgings are being coined accurately to size, particularly in the automotive industry, added Mr. Anderson. This reduces finishing and some forgings require only grinding as a finishing operation. He also reports development in forging high-nickel alloy bolts. The

bolts are heated between every operation on the header to get a uniform structure, three to five operations being required, depending on the size of the bolt.

The trend in the manufacture of forging machines during the past year has been to increase weight and to provide deeper die space, permitting greater multiplicity of operations, states Mr. Anderson. There is also a trend toward using the eccentric type of shaft, thus eliminating the crank and providing a more rigid machine and also a trend toward a sliding head movement that takes the place of a Pitman. This type of construction, it is claimed, reduces maintenance and gives more area with lower pressures per square inch at the high pressure point.

"Accuracy of products, coupled with high rates of production, has provided the highlight in the way of trend in the forging industry during 1936," states R. E. W. Harrison, vice-president, the Cham-

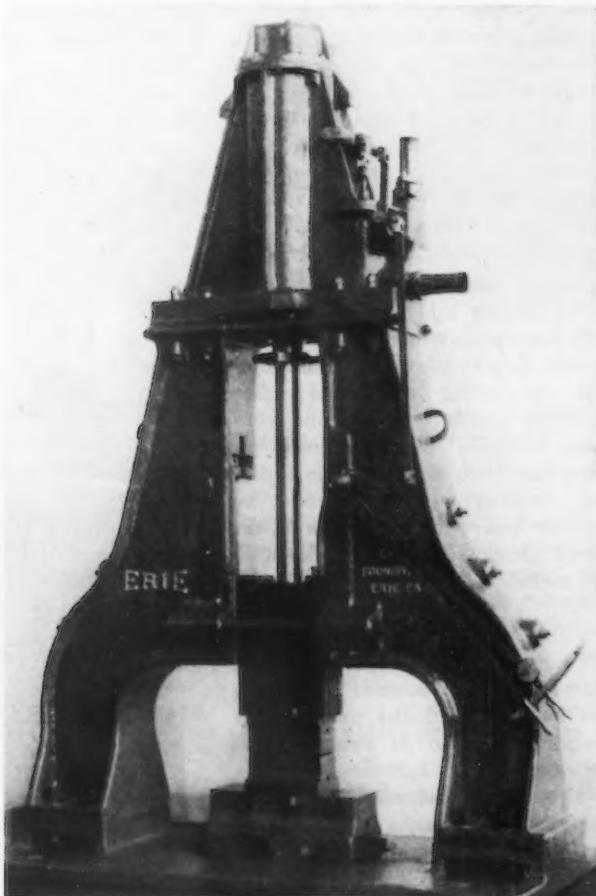
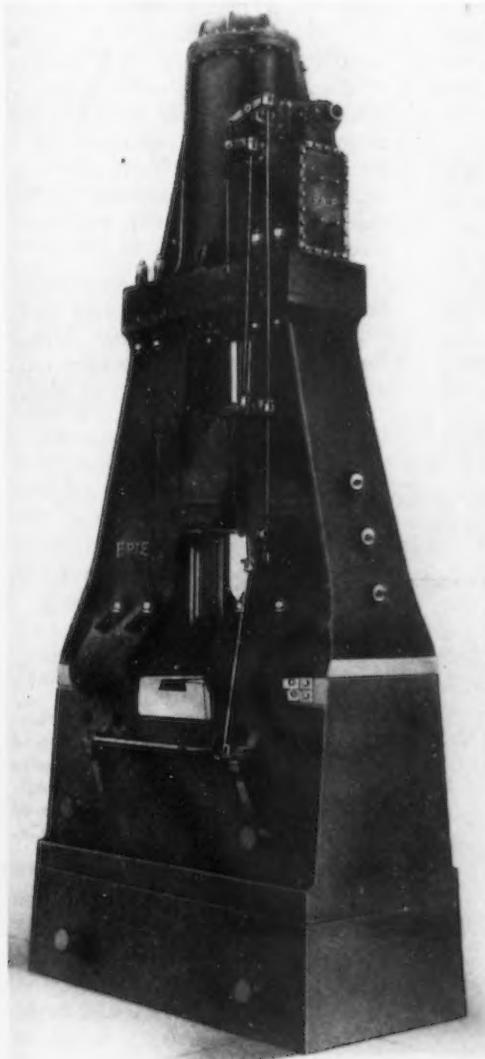
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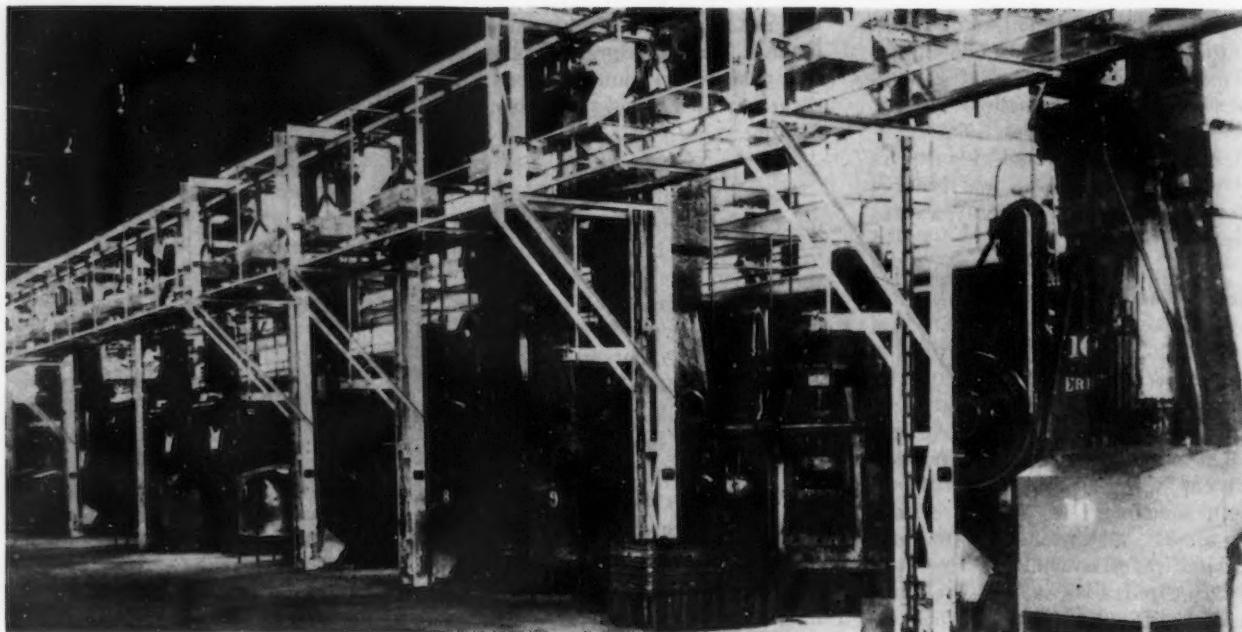
FIG. 12—Erie crankshaft hammer of 12,000 lb. capacity.

• • •

BELOW

FIG. 13—Erie double frame forging hammer.





• • • FIG. 14—Forge shop of Chevrolet Division of General Motors at Muncie, Ind. • • •

bersburg Engineering Co., Chambersburg, Pa. "Dies are being made to greater exactitude than ever before, machining allowances are being cut, draft has been successively reduced during the last three years from $7\frac{1}{2}$ deg. to $3\frac{1}{2}$ deg. and now one of the largest users of drop forging equipment is producing eight throw crankshafts with $1\frac{1}{2}$ deg. of draft on the dies.

"There has been a more general acceptance of the best quality grades of alloy steel in preference to carbon steel for rams and anvil caps, and the thought gains in strength that it is poor economy to equip a hammer with alloy steel heat-treated ram and anvil cap with dies of a different material.

"There has been a marked tendency during the past year to use still heavier hammers on such well known classes of work as automobile connecting rods and other parts of similar weight and contour. Definite physical improvement has been noted in connecting rod forgings produced on the heavier tool which requires fewer blows wherewith to fill the die with hot metal."

Hammer Types

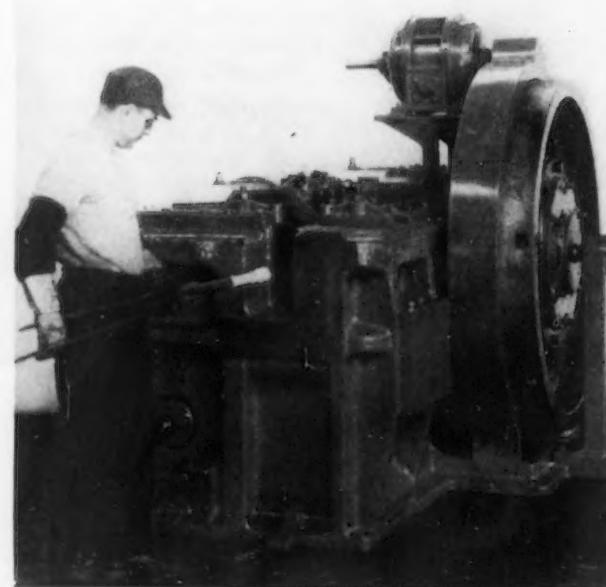
The recently designed double frame forging hammer to which has been applied the principle of design developed in recent years for steam drop hammers appears to have gained popularity. During the past six months his company has sold more double frame forging hammers than it did in the pre-

ceding 10 years, states McDonald S. Reed, Erie Foundry Co. Practically all these have been from 5000 to 10,000 lb. in rated sizes. Previously smaller sizes had the call. Operators, according to Mr. Reed, report increased output due to improved cylinder design, easier control and greater percentage of productive time.

In the board drop hammer field motor-driven hammers continue to outsell the belt-driven type, according to Mr. Reed. A number of motor-driven board drop hammers which are self-contained but have heads of the belt-driven type and are operated through V-belts from motors mounted on the backs of

the frames were built by his company during the past year. This is said to be less expensive construction than the usual geared head used on a motor-driven hammer and the development is being watched with interest by a number of drop forgers. In some cases the V-belt drive has been used, but the motors have been mounted on a structure supported from the roof trusses over the hammers rather than being mounted on the hammers themselves.

In the competition between steam drop hammers and board drop hammers Mr. Reed states that during the past year the former have outsold the latter in a ratio of about



• • • FIG. 15—Small, high-speed air clutch forging machines of 1-in. and $1\frac{1}{2}$ -in. capacity are recent additions to the line of the Ajax Mfg. Co. • • •

two to one. He attributes the lead of the steam drop hammers to the demand for hammers in the larger sizes in which the board drop hammers cannot compete. Considering only hammers of the smaller rated sizes for work within the range of the larger 4-roll board drop hammers built by his company, the board drop hammers have held their own, Mr. Reed states, and they have run ahead of the steam drop hammers in sizes around 2000 lb. However, he adds that there is still some work done on comparatively small hammers for which rapid blows and flexibility of control are highly important, creating a demand for 1000-lb., 1500-lb., and 2000-lb. steam drop hammers.

Indicating the trend towards the use of larger hammers, a commercial drop forging shop in Illinois recently placed an order for a 25,000-lb. Erie hammer which will be shipped early this year. At present it is believed that there is only one hammer of this capacity in this country and this is used for its own by a company that does not cater to outside jobbing work. The company purchasing the 25,000-lb. hammer has a demand from its customers for larger drop forgings which will require a hammer of the increased size.

Many forge shops have steam drop hammers rated at 12,000 lb. and there are said to be 10 to 20 hammers in the country with ratings from that size up to 18,000 lb. The shop installing the 25,000-lb. hammer therefore will take a place in a very limited group capable of handling unusually large drop forgings.

Another unusually large hammer, one of 20,000-lb. capacity, was sold by the Erie Foundry Co., and will be shipped shortly to England, where it will be used for drop forging automobile propeller frames.

A 16,000-lb. Chambersburg steam drop hammer for making crankshafts was installed last year by the Buick Motor Co., supplementing 12,000-lb. hammers installed in the Buick plant for the same purpose during the previous year.

Automotive Forgings

Crankshaft forging speeds have been increased by improved hammer design. The crankshaft hammers installed by Chevrolet and Chrysler last year were of 12,000-lb. capacity and, while they are not identical, they are all fitted with the new flat valve cylinder. Al-

though the 1937 Chevrolet crankshaft weighs about 12 lb. more than the crankshaft previously used, the new hammers are able to forge the shaft with fewer blows. The rams and piston rods in the new hammers are identical with those in the old, so that there is

was built from the ground up they were able to apply their knowledge and long experience without the necessity of compromises to make the layout fit in with a plant already existing. The plant is considered a model both in respect to building construction, ventilation,

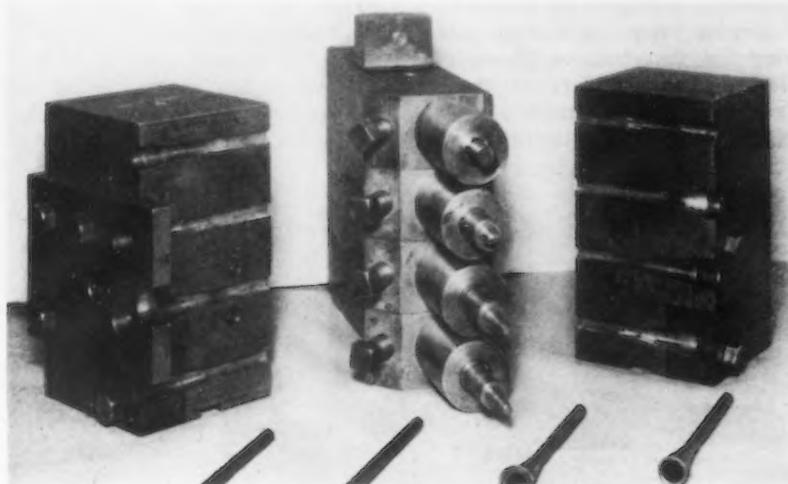


FIG. 16—Tools and dies for making sockets for carpenters' chisels on the 1-in. Ajax.

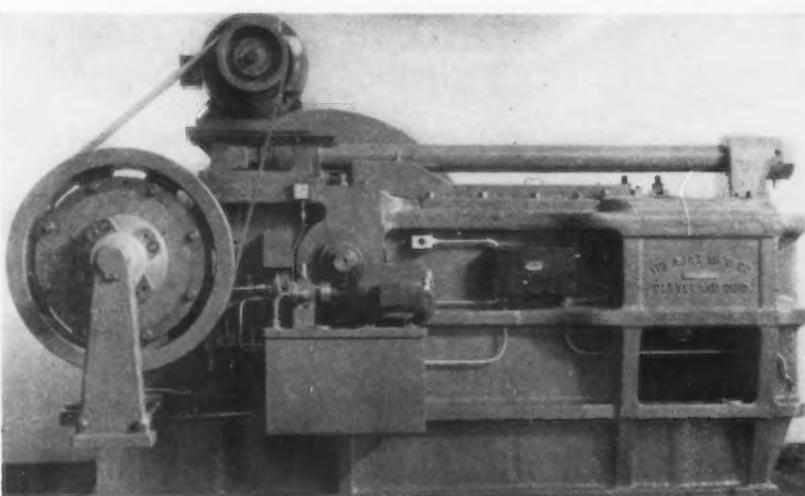


FIG. 17—Hydraulic clutch mechanisms are provided on the larger sizes of Ajax forging machines.

the same weight to be handled. But the new hammers are faster and strike a harder blow, even though the cylinder bore has been reduced to 23 in. as compared with a cylinder bore of 27 in. in the old hammer for handling a ram of the same weight.

The Chevrolet automobile forge shop built last year at Muncie, Ind., and known as the Chevrolet-Muncie Division of General Motors Corp., is regarded as the outstanding addition to the drop forge industry during the year. This plant was laid out and is being operated by men who have had years of drop forging experience and as it

materials handling and equipment. The forging equipment consists of seven Erie steam hammers, five Erie motor-driven board drop hammers, nine Erie hot trimming presses, five Erie cold trimming presses, six Ajax forging machines, an Ajax forging press and an Ajax gap roll. Complete cleaning and heat treating equipment is also provided.

Cast Versus Forged Cranks

Drop forgers and manufacturers of forging equipment have watched very closely developments in the automobile crankshaft field to see if any of the other automobile

manufacturers would follow the lead of the Ford Motor Co. and change from forged to cast iron crankshafts. If any other automobile builders followed in Ford's footsteps, it was expected that it would be the two others competing with Ford in the volume production field.

However, batteries of hammers for forging crankshafts were sold during the year both to Chevrolet and Chrysler. Builders of these cars are said to have made a very careful study of the substitution of

require considerable drawing, he states, are not adapted for production on board drop hammers, but almost any forging that can be made on a board drop hammer can also be made on a steam drop hammer.

Steam Versus Board Drops

There are a few exceptions to this, these being mostly confined to work of the large area, thin section type where rapid cooling of the metal when placed between the dies makes it highly desirable that

steam drop hammer previously mentioned, which will be shipped to England, will be an isolated installation and will be operated on compressed air, since it was decided that this would be more advantageous than to install a steam boiler and operate on steam. Two compressor units, each of half the required capacity, will be used because a single compressor unit would have been so large that its delivery could not be made in a reasonable time.

The average steam hammers will

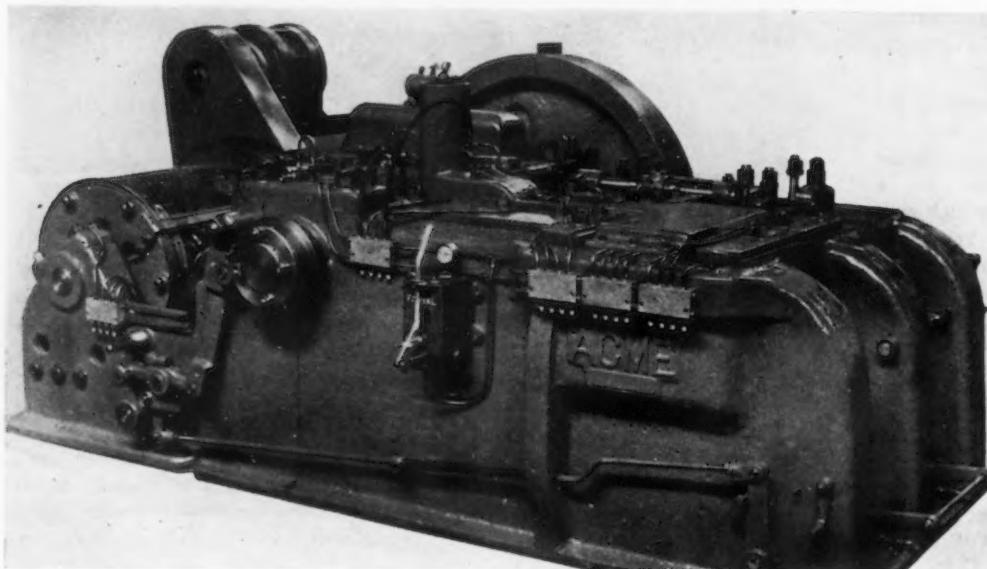


FIG. 18—Among other new features, the Acme Model 35 cushion drive forging machine now has a central lubricating system.

the cast iron for the forged crankshaft and as their investment in forging equipment during the year ran into hundreds of thousands of dollars, this indicates that there is not a trend to cast crankshafts. Incidentally, the Ford design has a short crank because of the V-8 construction, and it is stated that this crankshaft because of this design is probably better adapted for manufacturing from a forging than either the Chevrolet or Chrysler crankshafts.

Comparing board and steam drop hammers, Mr. Harrison states that each type has its own particular field of application and choice must be based on types and quantities of pieces to be made and operating and installation expenses. While a board drop hammer installation requires no immediate adjacent power plant or an air compressor, the size of forgings that can be produced on this type is limited, as well as the flexibility of technique which characterizes the steam hammer installation. Forgings which

the constant blow feature of the board drop hammer be employed. Mr. Harrison summarizes the advantages and disadvantages of the two types of hammers as follows:

The steam drop hammer is entirely under the control of the operator, whereas in the board drop hammer the operator simply controls starting and stopping. On comparable classes of work the steam drop hammer is more productive than the board drop hammer.

The steam drop hammer operator is generally a more highly skilled operator than the board drop hammer operator.

The over-all investment in board drop hammers is usually less than that in steam hammers for the same amount of production.

Forgers showed considerable interest during the year regarding the advantages and disadvantages of operating hammers on compressed air in place of steam.

A number of hammers were installed for air operation, states Mr. Reed, and some steam operated shops have been changed over to air. Incidentally the 20,000-lb.

perform equally well with either steam or air, Mr. Harrison states. However, he warns that every forge shop cannot be changed over to air to operate economically.

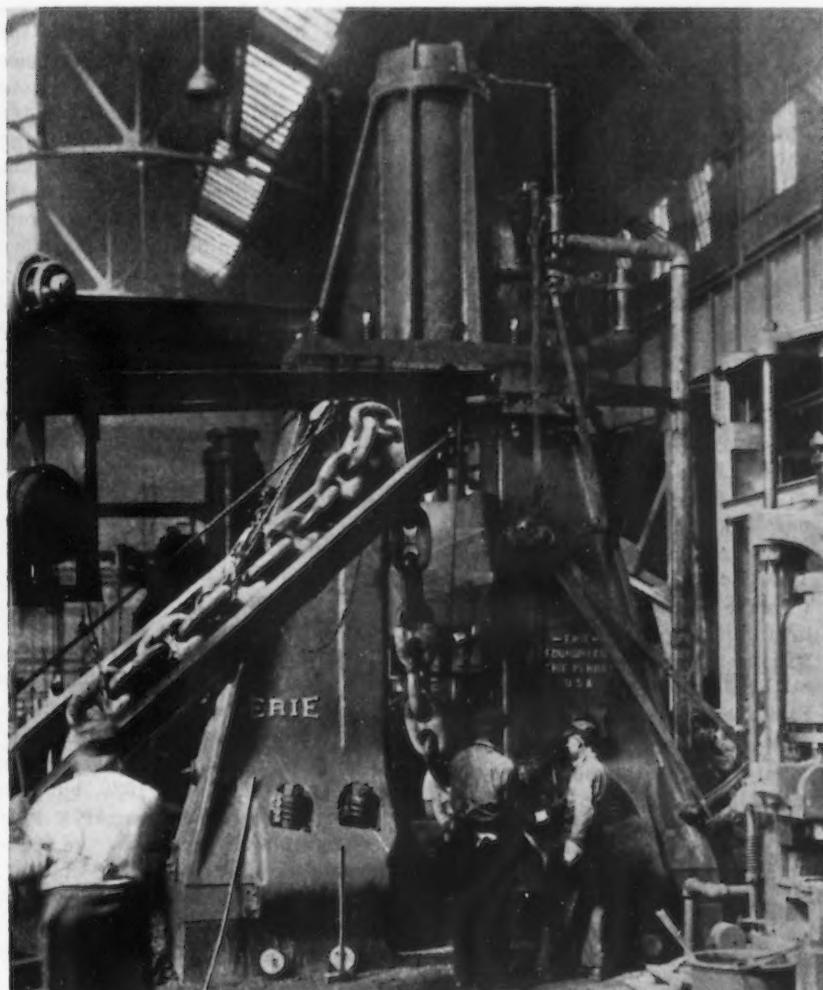
Steam Versus Air

Forge shops on mass production making parts for the automotive industry can as a rule be more cheaply operated on steam than air, according to Mr. Harrison, because of the high load factor they can maintain on their boiler plant, which can be made a very efficient plant and which can produce steam at low cost. Forge shops in this class work with large orders, have infrequent die changes, and usually several operations are completed on the metal with one heat. As these shops are usually operated on a 16 to 24-hr. basis, their standby time is small. In semi-production plants usually operated in a single shift and making rather small lots of forgings and having rather high standby losses on steam, the load factor on the boiler plant is decreased and this type of

plant will usually show economy when operated with air instead of steam.

Forge shops doing repair or jobbing work where flat die forging hammers are used, have an unusually low load factor and the stand-by losses are even higher than in

and rivets, two bolt-heading and upsetting forging machines embodying completely new design, shown in Fig. 15, were brought out recently by the Ajax Mfg. Co., Cleveland. These models, rated at 1-in. and 1½-in. capacity, are equipped with the Ajax air clutch



ABOVE

FIG. 20—Forging 4-in. die block anchor chain at Boston Navy yard.

• • •

AT RIGHT

FIG. 19—Four-in. anchor chain links of the die-lock type as machine forged on 6-in. Ajax air clutch.

the production shop. This type of installation, in Mr. Harrison's opinion, can be very profitably changed over to air operation.

One shop using 18 drop and four flat die hammers has changed from steam to air, Mr. Harrison stated, at an estimated saving of more than \$15,000 a year.

Briefly summarizing his comments, Mr. Harrison states that air operation for forge shops is most economical when the load factor is low and steam is not needed also for other work.

High Speed on Small Work

For rapid production on a wide variety of intricate upset forgings as well as for making nuts, bolts

which is used on the company's larger forging machines.

These small forging machines because of their high speed are particularly suitable for light small work that cools rapidly, as well as

for work that calls for a hole which is pierced on the machine instead of being drilled after the piece is forged.

One of the illustrations, Fig. 16, shows the dies and tools for making sockets for a carpenter's chisel, a thin wall forging of high carbon steel, with one of the 1-in. machines. These new machines are compact, occupying less floor space than earlier models. They produce work to close tolerances. In many cases machine allowances are said to be a little more than are required for removing the decarbonizing skin and, where a precision finish is not required, machining can be entirely eliminated by accurate forging.

The air clutch, with its instantaneous treadle response, it is stated, has increased production, decreased fatigue of the operator and makes possible the completion in a single heat of forgings which formerly required a reheat after preliminary upsetting. The smooth, cushioned action of the air clutch has replaced the rack and jar which always accompanied clutch engagement, and is said to have substantially reduced idle machine time for maintenance and repair. The band brake, which is released mechanically, is set by a cam operated lever which stops the machine accurately on open stroke.

The toggle grip is the same as in the larger machine, with the large diameter pins, which are subjected to the grip load, middle supported so as to be placed in quadruple shear. The crank movement with eccentric pin is used instead of a cam to actuate the toggles,



because it permits a much higher speed of operation. With this powerful die gripping mechanism, it is possible to utilize the side grip for numerous shearing-off, swaging,

(CONTINUED ON PAGE 85)

NEW CAPACITY

Steel Industry Spends Over \$200,000,000 in 1936 and Will Follow With an Additional \$175,000,000 to \$225,000,000 in 1937, as Individual Units Attempt to Diversify Their Products, Increase Capacity and Maintain a Strong Competitive Position.



A STRIVING for diversification and a desire to do away with obsolescence have engendered a steel mill construction program unmatched since the War period. Disbursements in 1936 added up to an impressive total of over \$220,000,000, and additional construction already planned for this year indicates expenditures of between \$175,000,000 and \$225,000,000. More flat-rolled steel capacity was put into operation during 1936 than for any other year in the steel industry's history. Over 3,500,000 tons of new hot plate, sheet and strip capacity went into production during the year and was complemented by well over 1,000,000 tons of new cold-rolling capacity. But the construction boom is still not over; for close to 1,600,000 tons of new hot-rolled capacity and about 1,100,000 tons of new cold-rolled capacity are scheduled for completion in 1937. Of the \$200,000,000 or so spent in 1936, the largest steel companies naturally accounted for the greatest percentage. United States Steel Corp. added two wide strip and plate mills and three cold mills, Bethlehem built hot and cold continuous mills at Lackawanna, N. Y., National Steel expanded its sheet capacity at Ecorse, Mich., and Jones & Laughlin completed its large 100-in. mill at Pittsburgh. Activity in 1937 will be distributed roughly in the following manner: Bethlehem will spend about \$35,000,000 at Sparrows Point, Md., United States Steel Corp. will divert \$30,000,000 or more to Birmingham to increase

flat-rolled capacity in the South, Republic will spend \$20,000,000 for a 98-in. mill and other additions, \$10,000,000 is appropriated for a new cold mill and other improvements at Youngstown Sheet & Tube Co., \$2,500,000 will be spent for coke ovens and a blast furnace by Inland Steel Co. and \$2,500,000 will be the cost of a new tin mill at the Gadsden, Ala., plant of Gulf States Steel Co.

Several underlying factors account for the enormous expansion in rolling equipment during 1936 and an almost equal expansion under construction for 1937. Continuous hot and cold mills placed in operation during previous years have demonstrated their ability to keep costs lower and even turn out a superior product for, say, the automobile industry. To maintain their competitive positions, all larger companies have found it necessary to add at least one or even a second and third mill of this type. At the same time, hot coils reduced cold to tin plate gage have given packers a product which is now being universally demanded—to this fact goes partial credit for forcing the building of continuous hot and continuous (or reversing) cold mills. Furthermore, some companies are seeking to correct overbalanced capacity in heavy products, such as Bethlehem Steel Co., and Jones & Laughlin Steel Corp., and other companies normally large producers of flat-rolled steel are striving to increase this type of capacity even further, such as National Steel Corp.

The result has been the installa-

tion of six continuous strip-sheet-plate hot mills in 1936 and the planned construction of three more in 1937. At the same time six continuous cold mills and over ten single-stand cold mills have been added to take care of hot mill output. Under construction for installation next year are six continuous cold mills and at least five single-stand cold mills.

Although the steel industry generally has sufficient raw steel capacity to take care of added rolling-mill equipment, several individual companies found themselves unbalanced in this respect and as a consequence added new furnaces. During 1936, eight open hearths were added, four by Inland Steel Co. and four by Great Lakes Steel Corp., thereby adding to the country's open-hearth capacity by 788,000 tons. This was the first addition of this type since 1931. Several blast furnaces were enlarged during the year and several others are scheduled for enlargement during 1937. No new blast furnace has been built since 1930, but this record will be broken next year when Inland Steel Co. adds a 50,000-ton stack at South Chicago, Ill., and Armeo adds a 180,000-ton furnace at Hamilton, Ohio.

In addition to the numerous rolling mills and melting units mentioned, the steel industry installed 38 electric furnaces and has at least nine on order for delivery in 1937. Other additions of the year include new tinning pots, new buildings, handling equipment, new wire-drawing and tube machines, etc.

A detailed list of new construction for each company in the United States follows:

United States Steel Corp.

Carnegie-Illinois Steel Corp.—At the Edgar Thomson works, blast furnace "J" was improved, and a modern car dumper for 90-ton cars and an electric car pusher are being installed. Homestead Works: A 100-in. semi-continuous sheared plate mill, with 4-high finishing stands, and auxiliary handling, shearing and plate finishing facilities were placed in operation. Ohio Works: Shearing and handling equipment for long billets at the 23-in. roughing mill were completed, and the following improvements are now under construction—new steam plant of four gas-fired boilers

of 1850 hp. each, soaking pit furnace for the 40-in. blooming mill, and improvements to blast furnace No. 1. McDonald Works: A 43-in. 4-high strip mill with auxiliary facilities and a new normalizing furnace were installed during 1936, and additions to the electric switching equipment at the mills and substation are under way for 1937. Clairton By-Product Coke Works: Facilities were added to double the capacities of the tar acid and naphthalene departments at the tar distillation plant, and a new benzol refining plant and a new tar distillation still and naphthalene and tar acid recovery facilities are under construction for completion in 1937. South Works: Added an additional cooling bed for the 22-in. structural mill, and during 1937 will complete blast furnace blowing, electric power and steam generating facilities. Gary Tin Works: Completed a 5-stand tandem cold reduction mill with processing and shipping facilities, and has a similar unit under construction for completion in 1937. Gary Sheet Works: Completed a continuous 4-high hot-strip mill with slab furnaces and other auxiliary equipment, and a 3-stand tandem cold reduction mill with processing and shipping facilities. During 1937, the Carrie Furnace division will improve blast furnace No. 6, and Wood Works will install a 84-in. 3-high finishing mill and auxiliary equipment for stainless steel plate and wide sheets.

Illinois Steel Co. completed an ingot mold preparation building at Nos. 3 and 4 open-hearth plants, a normalizing furnace at the rail mill, a tandem cold-forming mill for light structural shapes, and rebuilt two batteries of ovens at the by-product coke plant. Early in 1937, new bottoms will be put in six furnaces at No. 1 open-hearth plant.

National Tube Co. at the Lorain Works made additions to blast furnace No. 6 and auxiliary facilities, and are currently rebuilding six open-hearth furnaces.

American Steel & Wire Co. in the Chicago district has under construction two additional rod mills with auxiliary facilities, and additional rod cleaning and continuous drawing facilities. The Cuyahoga Works is building a special type of cold reduction mill, and tempering equipment is being added at Worcester South Works.

Tennessee Coal, Iron & Railroad Co.: Improved the shearing facilities at the plate mill, and is making additions to the hot mills and increasing the capacity of pickling and galvanizing departments. An extensive building program is now getting under way and will include the following: Additional production facilities for cold-reduced tin plate, including two 5-stand tandem 4-high cold mills with auxiliary equipment. A 43-in. hot strip mill will be constructed, together with a 45-in. blooming mill. Two new coke batteries of 73 ovens each will be built.

Universal Atlas Cement Co. is adding new crushing equipment, storage and packing facilities, and is substituting electric power for steam.

* * *

Bethlehem Steel Co., Bethlehem, Pa.—Installed a 5-stand, 4-high tandem cold reducing mill, together with finishing facilities for the production of cold-reduced tin plate, at the Maryland plant. At the Cambria plant additions were made to the finishing facilities of the rod and wire department, including a unit for the production of Bethanized wire. At Buffalo, a 79-in. continuous hot strip mill, a 75-in. 3-stand

tandem cold mill, a 54-in. 3-stand cold mill, 93-in., 79-in. and 75-in. temper mills and one 54-in. 2-high skin pass mill were placed in operation. At the Maryland plant, the following installations are scheduled for completion in 1937: A 56-in. continuous hot strip-sheet mill, together with finishing facilities, for the production of hot-rolled sheets and strip; an addition to the tin plate department, including a 4-high 5-stand tandem cold reducing mill, together with facilities for the production of cold reduced tin plate; additional finishing facilities for the rod and wire department; two additional heating furnaces at the plate mills; construction of 100 standard gage cars. At the Lackawanna plant, plans have been completed for six additional soaking pits at the 44-in. blooming mill, additional finishing facilities at the sheet mills, and the construction of 225 standard gage cars. At the Cambria plant, additional finishing facilities will be constructed at the rod and wire department, and at the Los Angeles plant a new warehouse for steel products will be built.

Continental Steel Corp., Kokomo, Ind.—For the Kokomo division, the following construction was completed during 1936: New straight line valves and forced draft fan on No. 1 open-hearth furnace; new wire drawing equipment, consisting of 14 No. 12 Vaughn Motobloc's, six No. 3 H.R. Vaughn wire drawing machines, six No. 5 H.R. Vaughn machines; new flippers and pointers; two new 500-kw. motor-generator sets, including switching equipment and new power wiring; enlarging of hot mill, sheet galvanizer and sheet warehouse buildings; new sheet pack shear, new crane for conveying sheets to shear, new roller leveler and new ridge roll machines. The Superior Sheet Steel Co. division rebuilt one pair furnace into a pack furnace, including run-out conveyors and catcher tables, built one complete double pair furnace and one 3-high mill unit and auxiliary equipment. At the Chapman Price Steel Co. plant, new mill equipment was added consisting of one new pair furnace, including conveyors, two new pack furnaces with conveyors, feeding and catching tables, new shears and roller levelers. The sheet galvanizing building was enlarged and rearranged, including new scales, roller levelers, shears, power wiring and electric lighting.

Acme Steel Co., Chicago.—Installed a continuous machine for galvanizing 32 strands of strip at one time; also one continuous 6-strand pickler. Equipment program for 1937 still undefined, but a 24-in. reversing cold mill is contemplated.

Allegheny Steel Co., Brackenridge, Pa.—Added one 7½-in. and one 20-in. Steckel-type cold mill.

Alan Wood Steel Co., Conshocken, Pa.—Equipped scrap yard with a skull cracker and provided Blaw-Knox valves on one open-hearth. Bought two 110-ton ladles. Provided sheet mills with two additional stands of cold rolls for light gage sheets. Dismantled the one mill, consisting of a roughing mill for sheet bars and finishing mill, and installed two finishing hot sheet mills, one 60 in. and one 48 in., with automatic tables and continuous pack heating furnaces. Installed a pickling department in the 84-in. plate mill for pickling light gage plates or sheets. Installed auxiliary finishing department machinery at sheet division, including box annealing, deoxidizing equipment, scrubbers and dryers, shearing,

roller leveling, cold rolling and additional buildings to facilitate handling finished material. Installed additions to the blooming mill back shear table, consisting of roller table, pushers, pilers, to provide facilities for handling hot plate mill slabs direct from the blooming mill to the plate mill furnaces. This involved new tong cranes and additional slab storage capacity.

American Rolling Mill Co., Middletown, Ohio.—Completed construction of one 3-stand, 80-in., 4-high United tandem cold mill and a one-stand 80-in. 4-high United hot mill. Annealing and pickling equipment for use in conjunction with the cold mill likewise added.

Angell Nail & Chaplet Co., Cleveland, Ohio.—About 9000 sq. ft. of floor space constructed, and new wire drawing equipment having a capacity of about 60 tons per day installed.

Athenia Steel Co., Clifton, N. J.—A new continuous pickling plant with a rated capacity of about 50 tons flat steel each 24 hr.

Atlantic Steel Co., Atlanta, Ga.—Will soon construct a new cleaning house of 15 tons per hr. capacity and a new baker for its wire mill.

Atlantic Wire Co., Branford, Conn.—Added six new Vaughan wire drawing benches, discarded the old cleaning house and equipment and built a new building with new equipment.

Barium Steel Corp., Canton, Ohio.—Installed a cold-rolling mill, a 1000-ton hydraulic press, ingot heating furnace and a continuous annealing and pickling unit.

Buffalo Bolt Co., North Tonawanda, N. Y.—New construction includes a gas-fired, bell-type annealing furnace or cover, three bases, a special cooling cover and two annealing covers, together with control valves and temperature controlling instruments. The equipment heat treats coiled bolt stock and has a capacity of 15 tons each 24 hr.

Burden Iron Co., Troy, N. Y.—Installed one 9-in., 5-stand hot mill with one 14-in., 2-stand rougher. The fuel system on all furnaces, including puddling furnaces, was changed from pulverized coal to oil.

Carpenter Steel Co., Reading, Pa.—Added two 1000 lb. high-frequency Ajax furnaces, and installed the following rolling equipment: Sykes herringbone cut tooth pinions in totally enclosed pinion stands with force feed lubrication for 10. to 12-in. and 18-in. mills, and 8x8x4-in. Bliss cluster mill; one new stand for 16-in. bar mill; one United coiling machine to take coils 48 in. in diameter up to 10x14-in. flats and one Torrington coiling machine for wire mill.

Other major mill additions include the following: Four 18x6-in. side-charged oil-fired annealing furnaces; two 6-in. Bar-dons & Oliver cutting-off machines; one 6-in. Medart bar-turning machine; six Racine hydraulic power saws; one 1800 cu. ft. Ingersoll Rand Compressor; and one Ingersoll milling machine to be used for billet preparation.

Altered one building and installed equipment for a mill testing laboratory. Remodeled several buildings, built several additions and added six new cranes to provide additional facilities for the preparation of stock for rerolling. Also constructed a scale and mill office building

and a 77x27-ft. brick and wood pickling building.

Central Iron & Steel Co., Harrisburg, Pa.—An additional open-hearth was equipped with a set of Blaw-Knox water-cooled reversing valves and a temperature-difference reversal. A 275-ft. steel extension was added to the 126-in. plate mill building, connecting this mill with the flanging department building. The facilities of the 126-in. plate mill were also augmented by the installation of an 84-in. plate shear, a circular plate shear, a shear knife grinder and a 10-ton overhead electric traveling crane. The flanging department was equipped with a 72-in. boring mill, a 500-kw. electric welding machine and a 300-lb. acetylene gas-generating machine. An additional milling machine for floor plate rolls was installed in the roll turning department.

The cast iron foundry department was moved to a new steel building and a new 5-ton overhead electric crane was added. An additional 1000-kw. rotary converter was installed in the electrical sub-station and the electrical department repair shop was equipped with a 4-ft. radial drill press. A 18x150-in. turning lathe, a cut-off saw and a 20-in. shaper were added to the machine shop equipment.

Contemplated additions for 1937 include the following: An additional set of Blaw-Knox water cooled reversing valves on another open-hearth; a 20-ton overhead traveling crane on the charging floor; an additional 150-ton sectional flanging machine; and a high-pressure boiler plant and an electric generating station to supply power for the entire mill.

Cold Metal Process Co., Youngstown, Ohio.—One 7½-in. Steckel-type cold mill built for own use during 1936, and one 26-in. and two 7½-in. Steckel mills under construction for completion in 1937.

Cohoes Rolling Mill Co., Cohoes, N. Y.—Installed a new \$15,000 boiler and replaced several pickling tanks in the conduit department.

Colorado Fuel & Iron Corp., Denver, Colo.—Fifty-four separate projects, including a new warehouse, numerous mill changes, expansion of number of products manufactured, and improvement of ore properties contemplated for 1937 at a total cost of \$2,225,000.

Columbia Tool Steel Co., Chicago.—Forging furnaces equipped with pyrometric controls, atmosphere control apparatus added and coal-fired furnaces were converted for the use of gas.

Cooper Alloy Foundry Co., Elizabeth, N. J.—Added two Taber squeeze molding machines, and installed complete ventilating system throughout the cleaning room. Contemplates adding one 1½-ton electric furnace in 1937.

Crown Cork & Seal Co., Baltimore, Md.—Installed a 31-in., 5-stand, 4-high tandem cold mill for rolling 24-in. tin mill black plate, one single-stand, 4-high Mesta skin pass mill, one Wilson annealer and one vertical, electric, neutral atmosphere, continuous annealing furnace made by Electric Heating Equipment Co. Two more Wilson annealers on order for 1937.

Crucible Steel Casting Co., Cleveland, Ohio.—Added one jolt roll-over draw-pattern molding machine, two new tumbling barrels, curtain ventilator for electric melting furnace and heat treating room.

two side-bay floor-operated cranes, sand blast room, increased air ventilation, and increased dust collection at shakeout and screen stations.

Detroit Steel Corp., Detroit.—Added one

24-in. 4-high, United, reversing, cold-strip mill.

Driscoll Wire Co., Shelton, Conn.—Designed and installed a pair of rolls for square wire, added three cone-type, wet,

New and Contemplated Smelting,

Blast Furnaces Scrapped in 1936 or to be Scrapped in 1937:

Reading Iron Co., Reading, Pa., Keystone furnace, 110,000 tons per year.

Woodward Iron Co., East Birmingham, Ala., Vanderbilt No. 2 furnace, 100,000 tons per year.

Youngstown Sheet & Tube Co., Hubbard, Ohio., No. 2 furnace, 150,000 tons per year. **Gulf States Steel Co., Birmingham, Ala.**, Alabama City furnace, 180,000 tons per year. **Witherbee, Sherman & Co., Port Henry, N. Y.**, No. 1 furnace, 108,000 tons per year (will not produce again, but scrapping may be delayed).

Blast Furnaces Built or Improved in 1936:

None built.

Youngstown Sheet & Tube Co., Youngstown, Ohio., "B" furnace, although previously listed for scrapping, this unit was entirely rebuilt and put into blast.

Pittsburgh Steel Co., Monessen, Pa., No. 1 furnace, relined.

Jones & Laughlin Steel Corp., Aliquippa, Pa., one stack relined and enlarged.

Hamilton Coke & Iron Co., Hamilton, Ohio., Hamilton furnace entirely rebuilt.

Blast Furnaces to be Built or Improved in 1937:

Inland Steel Co., South Chicago, Ill., new furnace with annual capacity of 50,000 tons. **Republic Steel Corp., Cleveland, Ohio.**, No. 4 furnace will be enlarged and rebuilt, thereby increasing capacity by 120,000 tons.

American Rolling Mill Co., Hamilton, Ohio., new furnace with annual capacity of 180,000 tons.

Open Hearths Constructed or Improved in 1936:

Inland Steel Co., South Chicago, Ill., four new basic units with annual capacity of 328,000 tons.

Laclede Steel Co., St. Louis, Mo., one 80-ton unit increased to 100 tons.

Great Lakes Steel Corp., Ecorse, Mich., four new units with annual capacity of 460,000 tons.

Bethlehem Steel Co., Lackawanna, N. Y., six previously built units put into production, thereby increasing yearly output by 600,000 tons.

Open Hearths to be Built or Improved in 1937:

No new furnaces have been definitely announced.

Empire Sheet & Tube Co., Mansfield, Ohio., all furnaces will be enlarged, thereby increasing yearly capacity by 82,000 tons.

Electric Furnaces Installed in 1936:

Pittsburgh Lectromelt Furnace Corp., 25 furnaces installed.

Detroit Electric Furnace Co., six ferrous furnaces installed.

Ajax Electrothermic Co., four steel-making furnaces with yearly capacity of 7800 tons.

American Bridge Co., three Heroult furnaces with total annual capacity of 12,000 tons.

Electric Furnaces on Order for 1937:

Pittsburgh Lectromelt Furnace Corp., six furnaces.

American Bridge Co., three Heroult furnaces with aggregate annual capacity of 51,000 tons.

Hot Mills Built in 1936:

Carnegie-Illinois Steel Corp., Homestead, Pa., 100-in., 7-stand, 4-high semi-continuous sheared plate mill with annual capacity of 729,000 tons.

Carnegie-Illinois Steel Corp., Gary, Ind., 80-in., 10-stand, 4-high strip mill with rated annual capacity of 600,000 tons.

Bethlehem Steel Co., Lackawanna, N. Y., 79-in., 10-stand, 4-high strip and plate mill with rated annual capacity of 600,000 tons.

Great Lakes Steel Corp., Ecorse, Mich., 96-in., 10-stand, 4-high strip-sheet mill with rated annual capacity of 600,000 tons.

Granite City Steel Co., Granite City, Ill., 90-in., 6-stand, 4-high strip-sheet mill with rated annual capacity of 375,000 tons.

Jones & Laughlin Steel Corp., Pittsburgh, Pa., 100-in., 10-stand, 4-high strip-sheet mill with rated annual capacity of 720,000 tons.

Wisconsin Steel Co., Chicago, 21-in., 6-stand, 2-high billet mill preceded by a 32-in. reversing mill; rated annual capacity of 780,000 tons.

Burden Iron Co., Troy, N. Y., 9-in., 3-high mill with annual capacity of 26,000 tons.

American Rolling Mill Co., Middletown, Ohio., 1-stand, 4-high sheet mill widened to 80 in. with annual capacity of 720,000 tons.

Washington Tin Plate Co., Washington, Pa., 34-in., 2-high, 1-stand mill with rated annual capacity of 3500 tons.

8-in., continuous, variable-speed drawing machines and two constant-speed, cone-type, wet, 8-in., continuous drawing machines. A new 3-ton, hoist-type freight elevator was installed, and a rod frame

and a $\frac{1}{2}$ -in. straightening and cutting machine are under construction.

Duraloy Co., Pittsburgh.—Installed new Pangborn sand-blast equipment and a new car-type annealing furnace.

Melting and Rolling Equipment

Hot Mills to be Built in 1937:

Republic Steel Corp., Cleveland, Ohio. 98-in., 10-stand, 4-high strip-sheet mill with rated annual capacity of 700,000 tons.

Bethlehem Steel Co., Sparrows Point, Md. 56-in., 6-stand, 4-high sheet and strip mill with annual capacity of 600,000 tons.

Tennessee Coal, Iron & Railroad Co., Birmingham, Ala. 48-in. universal mill followed by a 6-stand, 48-in., sheet mill; rated annual capacity of 300,000 tons.

Youngstown Sheet & Tube Co., Youngstown, Ohio. 1-stand reversing mill for rounds with rated annual capacity of 420,000 tons.

Cold Mills Built or Installed in 1936:

Carnegie-Illinois Steel Corp., Gary, Ind. 72-in., 3-stand, 4-high sheet mill, an 84-in., 2-stand, 4-high sheet mill and a 72-in. reversing sheet mill, with aggregate yearly capacity of 400,000 tons.

Republic Steel Corp., Niles, Ohio. in 42-in., 4-stand, 4-high sheet-strip mill with annual capacity of 70,000 tons.

Granite City Steel Co., Granite City, Ill. 48-in., 4-high reversing mill with annual capacity of 40,000 tons.

Elliott Brothers Steel Co., New Castle, Pa. 7 $\frac{1}{2}$ -in. Steckel-type with rated annual capacity of between 3600 and 4000 tons.

Allegheny Steel Co., Brackenridge, Pa. 7 $\frac{1}{2}$ -in. Steckel-type, with rated annual capacity of between 3600 and 6000 tons.

Allegheny Steel Co., Brackenridge, Pa. 20-in., Steckel-type, with rated annual capacity of 7200 and 21,600 tons.

Wallace Barnes Co., Bristol, Conn. 7 $\frac{1}{2}$ -in., Steckel-type, with annual capacity of 3600 to 6000 tons.

Cold Metal Process Co., Youngstown, Ohio. 7 $\frac{1}{2}$ -in., Steckel-type mill with rated annual capacity of 3600 to 6000 tons.

Bethlehem Steel Co., Lackawanna, N. Y. 75-in., 3-stand, 4-high tandem mill, one 54-in., 3-stand, 4-high tandem mill, 93-in., 79-in., and 75-in. temper mills and one 54-in. 2-high skin pass mill, with combined annual capacity of 300,000 tons.

Crown Cork & Seal Co., Baltimore, Md. 31-in., 5-stand, 4-high tandem mill and single-stand skin pass mill with combined annual capacity of 21,000 tons for 8-hr. day.

Washington Tin Plate Co., Washington, Pa. 24-in., 2-stand mill with annual capacity of 3500 tons.

Pittsburgh Crucible Steel Co., Midland, Pa. 26-in., 1-stand, 4-high reversing mill with annual capacity of 80,000 tons.

Sharon Steel Corp., Sharon, Pa. 12-in., 1-stand, 4-high reversing mill with annual capacity of 30,000 tons.

American Rolling Mill Co., Middletown, Ohio. 80-in., 3-stand, 4-high tandem mill with annual capacity of 300,000 tons.

West Leechburg Steel Co., Leechburg, Pa. 29-in., 1-stand, 4-high non-reversing mill with annual capacity of 40,000 tons.

Youngstown Sheet & Tube Co., Indiana Harbor, Ind. 42-in., 1-stand, 4-high reversing strip mill and 42-in., 4-high planishing mill, with combined annual capacity of 30,000 tons.

Bethlehem Steel Co., Sparrows Point, Md. 5-stand, 4-high tin plate mill with annual capacity of 200,000 tons.

Cold Mills to be Installed in 1937:

Republic Steel Corp., Cleveland, Ohio. 98-in., 10-stand, 4-high strip-sheet mill with annual capacity of 650,000 tons.

Carnegie-Illinois Steel Corp., Gary, Ind. 42-in., 5-stand, 4-high strip mill with annual capacity of 100,000 tons.

Tennessee Coal, Iron & Railroad Co., Birmingham, Ala. two 42-in., 5-stand, 4-high strip-sheet mills with combined annual capacity of 200,000 tons.

Youngstown Sheet & Tube Co., Youngstown, Ohio. 4-high strip mill with annual capacity of 180,000 tons.

Wheeling Steel Corp., Yorkville, Ohio. 4-high strip mill with annual capacity of 100,000 tons.

Detroit Steel Corp., Detroit. 24-in., 4-high reversing mill with annual capacity estimated at 1500 tons.

Bethlehem Steel Co., Sparrows Point, Md. 56-in., 5-stand, 4-high strip mill and a reversing mill with combined annual capacity estimated at 150,000 tons.

Cold Metal Process Co., Youngstown, Ohio. 26-in., Steckel-type, with yearly output of about 18,000 to 48,000 tons.

Cold Metal Process Co., Youngstown, Ohio. two 7 $\frac{1}{2}$ -in., Steckel-type mills, with yearly output between 7200 and 12,000 tons each.

Buyer unknown, 18-in., Steckel-type, with yearly output between 7200 and 12,000 tons.

Buyer unknown, 38-in., Steckel-type, yearly output of about 24,000 tons.

Eastern Rolling Mill Co., Baltimore, Md.

Four Wilson annealing units installed.

Elliott Brothers Steel Co., New Castle, Pa.—Installed one Steckel-type, 7 $\frac{1}{2}$ -in. cold mill.

Empire Sheet & Tin Plate Co., Mansfield, Ohio.—Contemplates increasing the capacity of all open hearths 20 to 25 per cent. Bar mill rolling limits changed from 8-in. maximum to 6 $\frac{3}{4}$ -in. minimum and 12-in. maximum. A 7-stand, 2-high sheet mill was changed to a tin mill having two 2-high roughing mills, using a continuous pair furnace, three 2-high finishing mills, and two 2-high single tin mills. Finishing departments were entirely changed to handle the new product by revamping the sheet pickler to a black pickler, redesigning certain annealing equipment, erecting a new white pickler, erecting a new cold-rolling unit, consisting of two 3-tandem mills and one 2-tandem mill. Three tin pots with all accessories were put in service and assorting room and shipping department were redesigned.

At the sheet mill, a new six-arm Mesta pickler for breakdowns or sheets was erected. A long-terne unit with complete accessories was constructed at the sheet plant. Two additional radiant tube annealing furnaces were put in service.

Ewald Iron Co., Louisville, Ky.—Purchased and now has in operation a new 10-in., 3-high, 5-stand, electrically-driven guide mill.

Falls Hollow Staybolt Co., Cuyahoga Falls, Ohio.—Added a new machine shop with 7000 sq. ft. of floor space.

A. Finkl & Sons Co., Chicago.—Tore down and then rebuilt the hammer shop at plant No. 1. Installed a 500-ton press with two forging manipulators, one of five-ton and one of one-ton capacity. Also installed a new three-ton forging hammer.

Ford Motor Co., Detroit.—One 4-high, 84-in., reversing cold mill and a 3-stand, 4-high, 56-in., tandem cold mill put into operation Feb. 3, 1936. The first continuous normalizing and annealing furnace for strip, of Westinghouse design, placed in production on May 15. All nine soaking pits serving the blooming mill changed from four-hole to three-hole design. New gas-cleaning equipment for blast furnaces likewise added. Six 30,000 gal. propane tanks were placed in operation for enriching blast furnace gas used for heating purposes in various parts of the Rouge plant. By March 1 two new batteries of coke ovens, with a total output of 4500 tons per day, will be in operation, and, in connection with the new coke ovens, a \$1,000,000 10,000,000 cu. ft. gas holder will be completed.

Granite City Steel Co., Granite City, Ill.—One 90-in., 4-high, United, continuous hot-strip mill with estimated annual capacity of 375,000 tons ready for operation at the end of 1936. Reversing 4-high cold mill 48-in. wide. Installed two additional Wilson annealing units, a coil pickling and a coil welding line, a breakdown line and an 89-in. normalizer. Power plant enlarged by two 7500 kw. high-pressure turbo generators. In 1937 will install two 75-in. automatic tinning machines, one new block of soaking pits and one additional breakdown line.

Gulf States Steel Co., Birmingham.—Placed two new five-hole, Vaughan, continuous wire-drawing machines in opera-

tion. A construction program aggregating \$2,500,000 is planned for 1937.

Harrisburg Steel Corp., Harrisburg, Pa.—Additions made to annealing, galvanizing, handling, hydraulic, and process and finishing equipment, with a total outlay of \$59,000. In 1937 an additional \$55,000 will be spent in the process and finishing department.

Inland Steel Co., Chicago.—Constructed four 150-ton basic open hearths. Added a new 62x140-ft. stripper building. New rolling equipment includes a 46-in., reversing, blooming mill, with nine 16-ft. circular soaking pits, and one 42-in. skin-pass mill with 200 tons daily rated capacity. Added six Swindell-Dressler, batch-type, cold-rolled strip annealing furnaces.

Planned for completion in 1937 are one blast furnace with a rated daily capacity of 1000 tons; 59 Koppers, Becker-type, coke ovens with a rated daily capacity of 800 tons; five Aetna Standard automatic tinning machines; and six radiant-tube, gas-fired annealing covers with 21 bottoms.

International Harvester Co., Chicago.—Installed one 32-in., 2-high, United blooming mill and one 1 stand, 21x32-in., 2-high, United continuous billet mill.

International Nickel Co., New York.—One 15-in., Steckel-type, cold mill being constructed for installation in 1937.

Jessop Steel Co., Washington, Pa.—One 9-ton, Heroult electric furnace, originally purchased in 1931, will be placed in operation early in 1937. Installed one specially designed, 20-in. cold sheet mill, designed particularly for saw steels and stainless sheets in all widths up to 42 in. and all gages down to 24, with an estimated capacity of 500 tons per month. Added three new car-type, natural-gas annealing furnaces, designed particularly for tool steels.

Jones & Laughlin Steel Corp., Pittsburgh.—At the Pittsburgh works, completed the construction of a continuous wide strip mill equipped to produce both hot and cold strip and sheets, with an estimated annual capacity of 720,000 tons. In connection with this construction, added a 20,000 kw. turbo generator and a battery of Babcock & Wilcox boilers. Blast furnace ladle house and pig machines were replaced, additional soaking pits at the new South Side blooming mill and a tar topping plant at the by-product coke plant were installed. At the Aliquippa Works, additional equipment was installed for producing integral tool joint drill pipe in the seamless tube mill department, and, also, modern threading equipment. A blast furnace was relined and enlarged. Increased the capacity of the 4-high cold reducing mill to 54,000 net tons per year, and increased cold-rolled tin plate facilities at Aliquippa and Pittsburgh Works to 121,000 net tons per year. Made additions to warehouses at Long Island City, N. Y., and at New Orleans, La. Several coal and ore mines reopened and equipped for operation.

Kilby Car & Foundry Co., Anniston, Ala.—Added one draw bench for $\frac{1}{2}$ -in., round, mild steel bars, and installed one pickling and liming unit with an 8-hr. capacity of 50,000 lb. of mild steel bolt stock.

Laclede Steel Co., St. Louis, Mo.—Rebuilt one 80-ton open hearth to 100-ton Stevens type, built two circular soaking pits, added an 8-stand, 10-in. Morgan rod finishing mill to existing continuous mill

and added wire-drawing equipment. At Alton, Ill., built a new wire-annealing furnace, added to warehouse capacity and made additions to the wire mill and joist department. Scheduled for completion next year are additions to shipping department, for tube mill, superheaters for all remaining boilers and further additions to wire-drawing equipment.

Lebanon Steel Foundry, Lebanon, Pa.—About \$25,000 expended for cast steel flasks to replace worn-out flasks, added two 4000-lb. Herman jolt roll-over pattern-draw machines, one Osborn stripping plate machine, one Osborn squeezer machine, one Johnston & Jennings jolt roll-over pattern-draw machine and one complete Pangborn shotblast room.

Ludlum Steel Co., Watervliet, N. Y.—During 1936 spent \$315,000 at Watervliet for the following improvements: One new pouring platform and extension to old pouring platform; a 10-ton Heroult electric furnace with all necessary auxiliary equipment, with an annual capacity of 15,000 tons; an 8-in. cold-rolling mill; a 24-in., 4-block drawing bench; a 12-in., 12-block drawing bench; eight multiple-diamond drawing machines; five centerless grinders; 14 swing-frame billet grinders; two polishing machines; one straightening machine; one bar straightener; one electric, car-type heat-treating and annealing furnace; two heat-treating furnaces; one gas-fired annealing furnace; one tube-type bright-annealing furnace; four pickling vats; two 10-ton cranes; one cut-off machine; three power saws; and one cropping shears.

About \$370,000 has been appropriated for the following improvements at Watervliet in 1937: One electric or gas annealing furnace; one 20-in. mill ingot and billet-heating furnace; one charging machine; new buildings and additions to existing buildings to improve inspection, annealing, centerless grinding and shipping departments, complete with cranes and moving of present equipment; additional small equipment, such as lathes, shapers, straighteners, etc.; rehousing, transferring and improving of machine shop and electric department in existing buildings; converting from steam to air operation all hammers in main hammer department and in forge shop; repair and improvement of scrap bins in melting department; rearrangement of billet grinding department and installation of new Fox grinders (now half complete); and modernization, rehousing and new equipment for physical and chemical laboratories.

At subsidiary plants, Wallingford Steel Co. and Forging & Casting Corp., about \$400,000 has been spent for the following improvements: Three bell-type electric annealing furnaces; one 16x36-in. roll grinder; one continuous annealing furnace for handling stainless steel strip; one new 42x192-ft. and one 60x100-ft. building; one Detroit indirect rocking furnace; four centrifugal casting machines; one annealing furnace; one heating furnace; re-installation of one 3000-lb. hammer and furnace to serve same; one 40-ft. 3-ton crane; and a considerable amount of new machinery including lathes, shapers, etc.

Medart Co., St. Louis, Mo.—Installed one of its own No. 1 Medart continuous straightening and polishing machines in the shafting department.

Mercer Tube & Mfg. Co., Sharon, Pa.—Added two new pickling units.

Michigan Seamless Tube Co., South Lyon, Mich.—Three new draw benches were set up during the year and considerable new equipment is planned for 1937.

National Steel Corp., Pittsburgh.—The Hanna Furnace Corp. division has completed plans for the construction of a battery of coke ovens as an addition to the pig iron producing facilities. The total cost will be \$6,000,000, and the installation will be made on Zug Island, in the Detroit River, on the site of the present two blast furnaces.

Northwestern Barb Wire Co., Sterling, Ill.—Two 10-ton Lectromelt furnaces installed for converting iron and steel scrap into $8\frac{1}{4} \times 8\frac{1}{4}$ -in. ingots, with an annual capacity of 90,000 tons. New capacity added includes a 3-high, 2-stand, 18-in. billet mill with an annual capacity of 150,000 tons, and, also, a continuous 10-in. rod mill capable of producing 150,000 tons per year.

Ohio Seamless Tube Co., Shelby, Ohio.—Added a continuous controlled-atmosphere annealing furnace and is installing equipment for making electric-welded tubing.

Ohio Steel Foundry Co., Lima, Ohio.—New foundry equipment includes one sand-blasting machine, one straightening press, one sprue cutter, and one 5-ton, 60-ft. bridge crane. New machine tools installed were two 36-in. roll lathes, one 6-in. radial drill, one 5-in. turret lathe, one $3\frac{1}{2}$ -in. flat turret lathe, one horizontal, heavy-duty milling machine, and one vertical boring machine.

Phoenix Iron Co., Phoenixville, Pa.—The entire output of the 24-in. mill and half the output of the 22-in. mill were put under cover. In 1937 the company contemplates putting the balance of the 22-in. mill stock under cover and doubling the capacity of the 22-in. mill's shippers crane.

Pittsburgh Crucible Steel Co., Midland, Pa.—Added one 26-in., 4-high, United reversing cold-strip mill. Built building and added equipment for electro-coating tin plate.

Pittsburgh Tool Steel & Wire Co., Monaca, Pa.—Added a 2-ton hoist, a 14-ft. wood pickling tank and a 4-ft. wood pickling tank.

Pittsburgh Tube Co., Pittsburgh.—Added one 20,000-lb. tube drawing bench, and rebuilt and improved two 40,000-lb. benches. A 5-ton-per-hr. continuous annealing furnace and new pickling equipment were installed. A pickle house (7000 sq. ft.), a cold drawing building (12,500 sq. ft.) and a pipe storage building (12,500 sq. ft.) with cranes also were constructed.

Reeves Mfg. Co., Dover, Ohio.—Has under consideration the purchase of three, continuous, double-pack furnaces, two continuous pair-furnaces and two, 3-high, roughing mills.

John A. Roebling's Sons Co., Trenton, N. J.—At Kinkora Works the ingot pre-heating furnaces were changed in design, an electric bell annealing furnace was installed in the wire mill, and, also, sulphuric acid storage tank was added. At the Trenton plant, an electric galvanizing unit for round wire and strips of various sizes was put into operation, and one hydrochloric acid storage system complete with pump and distributing lines was added. Other new equipment included three new electric, bell-type, annealing furnaces for strip steel, an ammonia dissociator with ammonia storage complete

with pumps and pipe lines, a hot-galvanizing rig for fine wire and strip and one planetary stranding machine.

Sharon Steel Corp., Sharon, Pa.—One 12-in., 4-high, United reversing cold-strip mill.

Simmons Co., New York.—New cooling beds costing \$15,000.

Simonds Saw & Steel Co., Lockport, N. Y.—Installed two 650-lb. and one 2000-lb. Ajax furnaces.

Standard Steel Works Co., Burnham, Pa.—Automatic draft control on three furnaces and combustion control on one furnace. A new sand storage building was erected and additional sand-handling equipment was installed. A number of changes in the steam plant are contemplated for 1937, and installation of additional machine tools is under consideration.

Taylor Wharton Iron & Steel Co., High Bridge, N. J.—Installed two 1500-lb. roll-over pattern-drawing molding machines.

Texas Steel Co., Fort Worth, Tex.—Added one Medart machine for cold finishing 1-in. to 1½-in. rounds. Added several machine tools in oil well supply department.

Thomas Steel Co., Warren, Ohio.—Under construction for 1937 are the following: One Surface Combustion Co. radiant-tube annealing furnace with four bases, and one 10-ton overhead crane. An 18-in. Steckel-type cold mill is being rebuilt.

Vulcan Crucible Steel Co., Aliquippa, Pa.—Installed two motor-driven air compressors to replace steam in forging hammers. Added three new car-type gas-fired annealing furnaces, one rolling mill heating furnace and two car-type gas-fired forging furnaces.

Wallace Barnes Co., Bristol, Conn.—Installed one 7½-in. Steckel-type, cold-rolling mill.

Washburn Wire Co., Phillipsdale, R. I.—Plans are completed for building a new shipping building measuring 300x67 ft. and containing two cranes.

West Leechburg Steel Co., Leechburg, Pa.—One 29-in., 4-high, United, non-reversing cold-strip mill added during 1936.

Wheeling Steel Corp., Wheeling, W. Va.—One 5-stand, 4-high, cold-reducing tin mill with necessary finishing and tinning equipment planned for 1937.

Wisconsin Steel Co., Chicago.—Bessemer department dismantled in 1936. Added a 40-in., 2-high, electric reversing blooming mill, a 35-in. reversing mill and 8-stand, continuous billet mill. No. 2 merchant mill completely rehabilitated and electrified.

Worcester Pressed Steel Co., Worcester, Mass.—Added new shearing and slitting equipment costing \$10,000, and two special furnaces for annealing stainless steel. Additional refinements and modernization in prospect for 1937.

Youngstown Sheet & Tube Co., Youngstown, Ohio.—At Campbell Works the following improvements were made: Blast furnace "B" was remodeled, which included a new shell, top, skip, changes to stock house, enlarged dust catcher, installation of a secondary dust catcher, and a new slag trolley; a modern wash and locker room for the blast furnace employees was built and equipped; constructed a new machine shop building, and increased power efficiency by constructing a 16-in. steam line from the No. 5 boiler house to No. 5 power house.

At Struthers Works the wire rod mill was changed to electric drive.

The following improvements are under construction for completion in 1937: At Brier Hill Works a number of changes were made in the present bar mill together with the installation of an intermediate mill to be used primarily for rolling rounds.

At Campbell Works a new building to provide additional space for hot-strip finishing is under construction; additional cold-strip capacity will be obtained by the installation of a 4-stand, 54-in. tandem mill and two skin-pass mills with necessary auxiliaries—this project also calls for additional annealing capacity; in the tube mills new upset tools for speedite joints will be added, also a new building which will contain cutting-off machines, facing machines, additional threading machines, and a large upset mill. Increased warehouse and finishing capacity for No. 14 mill plus four cutting-off machines, threading machines and auxiliaries to round out production on this mill are likewise under construction.

At Indiana Harbor Works the merchant mills will be improved by the addition of a machine with table, skids, etc., for mechanically chipping billets, and an extension to the cooling pit for the 14 to 18-in. mill. New equipment for pickling, liming, and oiling bars and coils necessary when producing alloy and special steels will be added, and, also, three furnaces for annealing and heat treating of coils from the 10-in. merchant mill. At the tin mill a 4-high reversing cold mill will be set up, together with a skin-pass mill with the necessary auxiliaries for increasing tin plate capacity. Provisions are being made for additional annealing capacity, three additional tin pots have been ordered, and a new box storage building measuring 40x216-ft. is under construction.

Republic Steel Corp., Cleveland, Ohio.—The Youngstown plant made additions to the electric weld tube mills to increase pipe-producing capacity, and installed new heat-treating equipment for treating oil well casing. At Warren, improvements were made in order to increase the production of tin plate, work of widening No. 1 hot-strip mill to 42 in. is under way. This work also includes the installation of larger motors and new furnaces which will permit rolling longer coils as well as increasing the capacity of the mill. A 3-stand tandem cold-strip tin mill is nearly completed at the Niles plant. This installation carries a full complement of finishing and tinning equipment necessary to produce 5000 tons of tin plate per month. The Central Alloy division has made improvements and additions to heat-treating equipment, and has added additional equipment to increase the production of Enduro strip.

At Chicago, a new wire mill has been constructed at the 118th Street plant capable of producing 3500 tons of wire products per month, and a new electric drive has been installed on the blooming mill. At Cleveland, No. 4 blast furnace has been torn down and is being rebuilt to a 1000-ton capacity, and work has been started on the construction of a 96-in. 10-stand tandem hot mill with all auxiliary equipment including one 3-stand tandem cold mill and two single pass cold mills, together with the necessary auxiliaries.

At Birmingham, a sintering plant has been installed which will aid in the production of additional high-grade pig iron. The Steel & Tubes, Inc., subsidiary has made extensive improvements and additional installations at its Cleveland, Elyria, and Brooklyn plants in order to increase its capacity for manufacturing all kinds of tubing.

National Steel Corp., Pittsburgh.—Subsidiary company, Great Lakes Steel Corp., installed four 150-ton open hearths, four 600-hp. waste heat boilers, a 96-in. wide hot strip mill, with all necessary shears, coilers, runout tables, pilers, etc. Also completed were five 4-hole box annealing furnaces, two continuous pickling lines, a 93-in., 3-stand tandem cold mill, a 54-in., 3-stand tandem cold mill, and two 93-in. and one 54-in. single-stand cold mills. A 93-in. single-stand cold mill and a combination flying shear unit are under construction.

The Michigan Steel Co. division installed four radiant tube annealing furnaces. Hanna Furnace Co. division has three blast-furnace-gas-fired boilers and three turbo blowers under construction for completion in 1937.

Weirton Steel Co. division increased steam and power output, relined No. 1 blast furnace, added an electrical precipitator for fine cleaning of blast furnace gas, and installed a disintegrator for fine cleaning of blast furnace gas used to fire soaking pits. In the 48-in. strip steel department, production was increased by adding an additional gas producer, four slab-heating furnaces were changed to triple-zone firing and area increased 50 per cent, coil conveyors were installed in the hot mill and pickler, four Surface Combustion portable annealing covers and shot blast equipment for conditioning rolls were added, and a 4-stand, 4-high, 38-in. wide tandem cold mill and a 12-ft. roll grinder were installed. Under construction at Weirton for completion in 1937 are the following: Two portable annealing covers; one slitter and scrap baler; one 60 x 400-ft. warehouse for tin plate; a new cold-roll drive and several conveyors.

At the Steubenville plant, the following additions are scheduled for completion in 1937: Eight additional tinning stacks, complete with Kemp immersion heating units and pneumatic vacuum bran clearing; two-bay extension to present annealing building; extension to warehouse and new scruff furnace with building; a Mesta cleaning, trimming and cutting line for cold-rolled strip; four Surface Combustion annealing covers; seven cold-roll stands; one Mesta four-arm white pickler with building; extension and crane for tinhouse. Completed during 1936 were the following improvements: Two Mesta cleaning and slitting lines for cold-reduced strip; three annealing covers; two tinning stacks; five stands of cold rolls; two shears for strip; 10 Kemp immersion heaters for tin pots; and additions to steam and electrical power.

Stainless Iron & Steel Corp., Baltimore, Md.—Completed plant improvements involving an expenditure of about \$420,000, made up of a new office building, and expansions of the melting and cold-finishing departments. Plans are under way for major additions to hot-rolling capacity during 1937.

Air-Clutch Equipped Forging Machine Designed to Give Higher Production

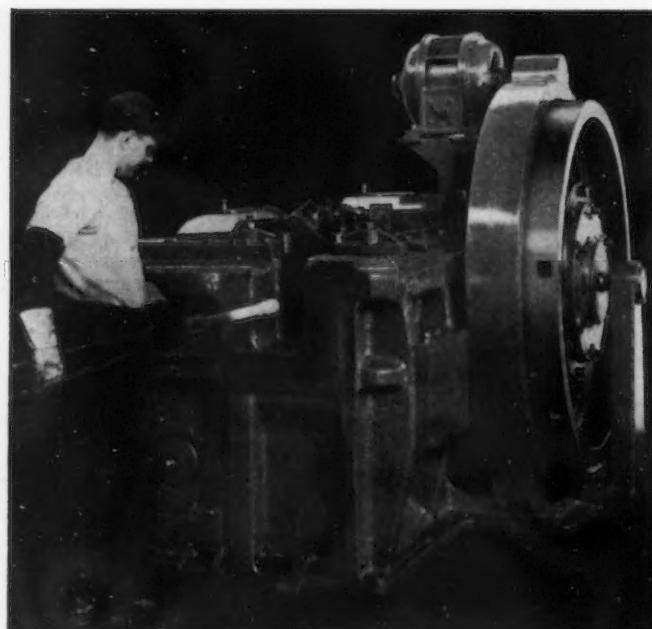
ABOLT heading and upsetting forging machine of new design and incorporating the company's patented air clutch is being offered by the Ajax Mfg. Co., Cleveland, in 1-in. and 1½-in. sizes. The machines are compact, occupying less space than earlier models, and give much higher production on a wide variety of intricate upset forgings, as well as a complete range of nuts, bolts and rivets.

Because of the capacity and

ing cycle, the air is cut off, disengaging the clutch. A cam on the rim of the brake drum then sets the brake, which stops the machine accurately on the open stroke.

The bed frame is a one-piece heavily ribbed, steel casting. Integral bearing housings, bridged with a heavy horizontal crown rib, provide rigid support for the forged alloy crankshaft which rotates in solid sleeve bearings.

The header slide, which is top



speed of the machines the flywheel is mounted on the crankshaft. It is driven by a motor mounted directly above the crankshaft housing, through either a fiber pinion, which meshes with an integral gear on the flywheel run, or through multiple-V belts.

To the instantaneous treadle response of the air clutch is attributed increased production, decreased fatigue of the operator, and in many cases completion in a single heat of forgings formerly requiring a reheat after preliminary upsetting. Smooth, cushion action is said to have reduced idle machine time for maintenance and repair.

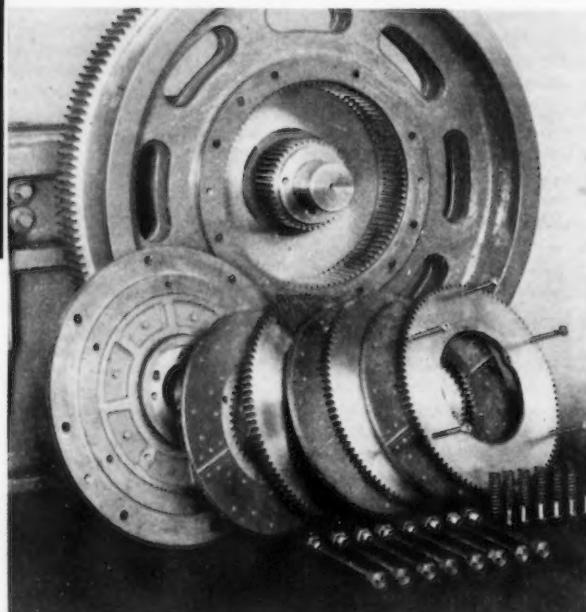
Depressing of the foot pedal releases the band brake and at the same time opens the air valve to the clutch. This introduces compressed air behind an air piston carried by the flywheel and applies pressure directly to the friction plates, starting the machine. At a predetermined point in the operat-

suspended from long, wide lips, is held rigidly in alignment by an extension guide bearing supported at a neutral position in the frame. An intermediate underarm holds the main slide body and the extended guide bearing in line and permits no deflection even under heavy loads. This patented slide construction provides complete accessibility of pitman assembly for inspection or adjustment.

The right-hand side liner of the header slide is screw plug adjusted to compensate for out-of-parallel wear. The long slide and easy means for maintaining accurate alignment is emphasized as holding the heading slide concentric with the die impressions, and making it possible on certain classes of work to hot punch holes and displace metal from the interior so accurately that considerable material and labor is saved in drilling or boring operations. The long, wide toolholders may be aligned without complicated adjustments at the front of the slide. They are carried within the slot-type pocket with no overhanging weight beyond the slide support bearings.

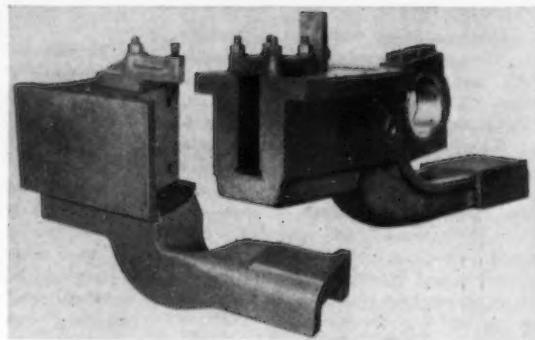
Excellent alignment and great overall guided length also feature

• • •
AIR-CLUTCH
forging machine designed for rapid, uniform and accurate production. The flywheel is mounted on the crankshaft and driven by a motor located above the crankshaft housing.
• • •



AT RIGHT
AIR clutch of 1½ in. forging machine disassembled to show annular cylinder friction plates, splined clutch hub and driving rim.

• • •
OUTBOARD-GUIDED die slide and extension-guided header slide in their relative operating positions.



the die slide. An elevated and shrouded support bearing beneath the main body of the die slide is completely protected from scale and cooling water. An outboard guide bearing prevents the dies from cocking. Thus the moving die is supported between bearings which maintain its face square with that of the stationary die, assuring accurate, uniform forgings.

The die grip is actuated from an eccentric pin on the end of the crankshaft, which permits the

high-speed operation of these small machines. Toggle pins which are subjected to the grip load, are large in diameter and are middle supported.

A fully automatic safety mechanism protects the machine from damage due to oversized or misplaced stock. It immediately resets itself so that production is not interrupted. An automatic lubricating system built into the machine provides proper lubrication of all moving parts.

Extra Head Increases Versatility of B. & S. Omniversal Miller

THE Omniversal milling machine built by the Brown & Sharpe Mfg. Co., Providence, R. I., is now available with an Omniversal milling head that greatly increases the range of the machine and also provides for synchronizing the knee-slide feed and headstock spindle rotation for milling spirals.

In addition to the fundamental movements and adjustments common to the universal milling machine, the Omniversal has an angular adjustment of the knee in a vertical plane at right angles to the spindle, and a horizontal feed of the entire knee assembly in the same plane. Furthermore, the new

milling head, which is adjustable parallel to the main spindle, has a spindle that can be set accurately to any angle in a horizontal or a vertical plane. This provides an easy and accurate means of obtaining both simple and compound angular settings in any plane; and work can often be milled in a number of planes, or drilled, bored or reamed at many different angles, without the use of special fixtures or attachments, and often without need of relocating the work in the holding device.

In general, the Omniversal milling head, which is mounted on the left side of the machine, has four

types of adjustment. The possible combinations are: (1) It may be used either in its normal position or in either of the overarm holes; (2) the head may be adjusted transversely, that is, parallel to the overarms throughout a range of 14 in. when on the left-of-column position, and 5% in. when used in either overarm position; (3) the head has universal angular adjustment, for the spindle can be set at any angle in a horizontal or vertical plane by verniers reading in 2 min. of arc; and (4) the spindle itself has a 2 in. axial hand feed, and may be clamped in position anywhere along its path of travel.

The milling head spindle is gear driven from the rear of the machine spindle in all positions, and has a speed range of 88 to 2860 r.p.m., in approximately a 2 to 1 ratio with the machine spindle speeds. Cutters can be used simultaneously in both the milling head spindle and the machine spindle.

New Device Protects Fractional-HP. Motors

A NEW thermal overload switch for fractional horsepower, motors, operating on line current and arranged for convenient mounting on the conduit or terminal box of the motor, has been placed on the market by the Gen-

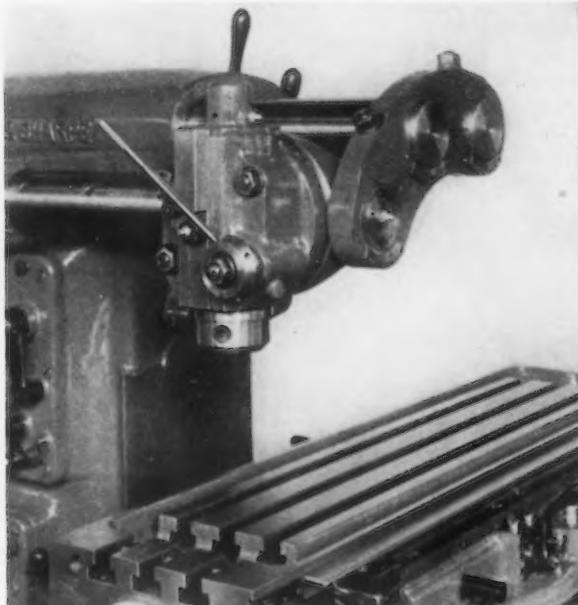
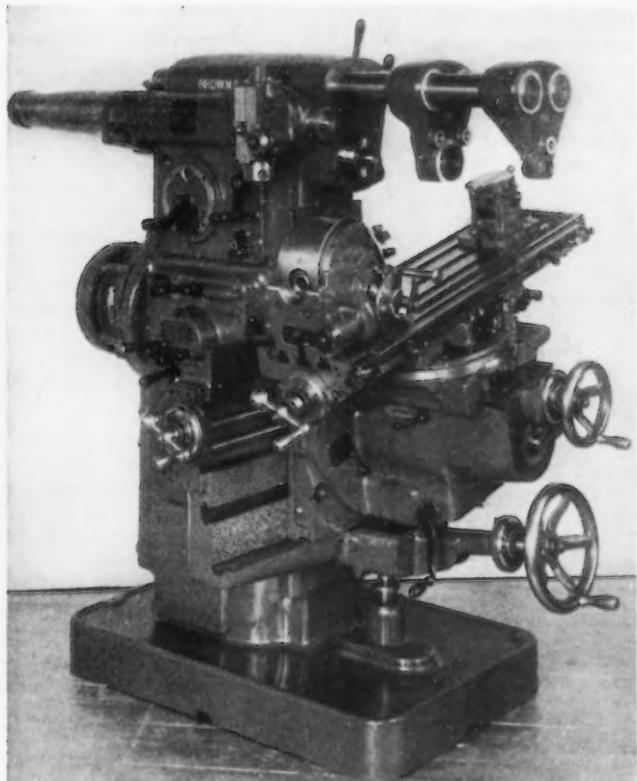
AT LEFT

OMNIVERSAL milling machine with extra milling head mounted on the left side of the column, where it is readily available for use.

• • •

BELOW

CLOSE-UP view of new Omniversal milling head, which may be used in the position shown or in either of the overarm holes.



eral Electric Co., Schenectady. It is completely self-contained, and has no links or plugs to be replaced.

Known as the "thermo-tector," the device automatically disconnects the motor from the line when an overload occurs. Then, when the motor has cooled, it is automatically reconnected to the line, the entire operation being repeated at a safe interval until the motor is freed of overload or is removed from the line. The device is also available arranged for manual resetting.

The switch consists of a thermostatic bimetallic helix, a heater helix, a flat steel spring, and a contact arm. The bimetallic helix is fixed at one end. The opposite end carries a slotted arm which rotates about one support of the spring. A low-resistance heater, which is connected in series with the motor winding and which carries the motor current, completely surrounds the bimetallic helix. This

heater element is welded in place and is tamperproof. The flat steel spring is mounted between two rigid supports in such a manner that it is slightly bowed. This bowed spring carries a contact arm which makes contact when the spring is bowed in one direction, but which opens the circuit when it is bowed in the other direction.

When the bimetallic helix is heated to a temperature above normal, the free end rotates and reverses the bow of the spring. When the spring passes dead center, it also moves the contact arm and disconnects the motor from the line. With the line open, current ceases to flow in the heater helix, the bimetallic helix turns in the opposite direction, and when the temperature is again normal, the spring snaps to the "on" position.

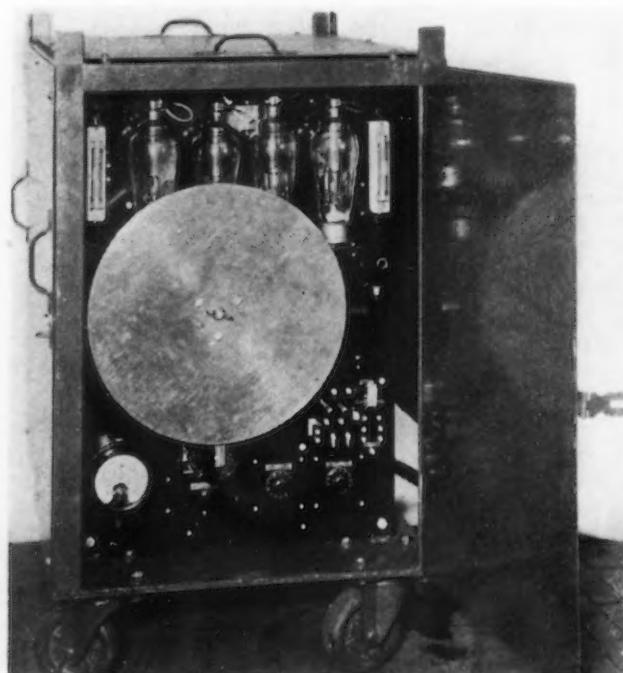
The Thermo-Tector is available for a-c fractional-hp. having rated full-load currents from 1.3 to 10.4 amp.

Seam Welder Unit Uses Ignitron Tubes

FOR seam welding of heavy gage steel, requiring heavy welding currents, and of special alloys that demand accurate timing and often heavy current, the Westinghouse Electric & Mfg. Co., East Pittsburgh, is offering a new control utilizing ignitron tubes. The device is said also to greatly improve the quality of light-gage steel welding.

This control times power im-

pulses in terms of a definite number of power cycles to a wheel-type-electrode resistance welding machine. Features include an inductive timer, consisting of a synchronous driven disk that rotates once a second and contains 120 holes, each corresponding to a half cycle of welding current. Steel pins are plugged into the holes according to the timing desired. Use of the ignitron tubes permits a design utilizing no voltages higher than line voltages and eliminates the need of power contactors and transformers.



IGNITRON seam welder control. The synchronous driven disk, which rotates once a second, has 120 holes into which steel pins are plugged to give the timing desired.

Device Regulates Repeated Operations

THE precision timing device shown in the accompanying illustration is adaptable to the regulation of steadily repeated operations or to manufacturing processes where it is desirable for the sake of quality or maximum production to provide a definite and uniform timing of certain parts of the operation. Various speeds can be provided for, and any proportion of loading time and work-



ing time can be arranged. In addition to a signal light or bell, a solenoid-operated release for presses or other machinery can be provided to be operated by the production guide. The device is made by the Production Instrument Co., 1325 South Wabash Avenue, Chicago.

Describes Mounting Of Soft Metals

IMPROVED methods of mounting and polishing soft metals, such as tin and its alloys, for examination under the microscope are described in a new research report of the International Tin Research and Development Council. Copies may be obtained from L. J. Tavener, 149 Broadway, New York.

Although the technique of preparing hard metals is well established, there are usually difficulties if it is applied to soft metals like tin. The paper discusses the advantages and disadvantages of mountants in general use, and explains the suitability of Bakelite, giving practical directions. Liquid synthetic resin mixed with a hardener is poured into a mold so as to surround the specimen. Standing for a day at room temperature, or an hour or two at 104 to 140 deg. F., causes the resin to solidify into a hard adherent molding. This

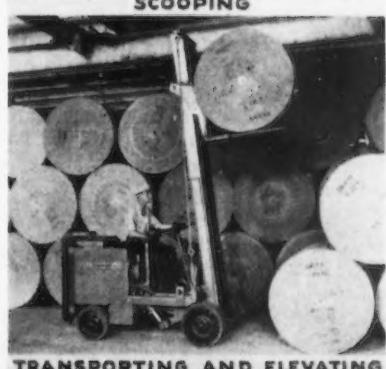
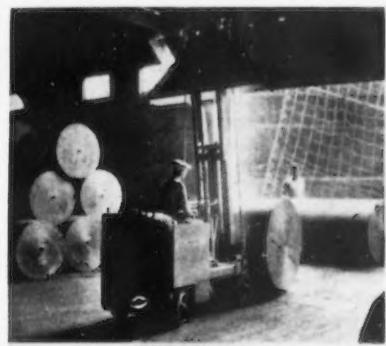
method is preferable to that in which similar resins are subjected to great pressures and much higher temperatures, since it does not affect the structure of the metal to be examined.

Special refinements in polishing and etching are described and photomicrographs of specimens prepared by ordinary methods and of the identical fields prepared by the new technique show the considerable gain in definition which the new methods make possible.

New Lift Truck for Paper Roll Handling

ESPECIALLY designed for handling and stacking paper in rolls, but equally adaptable for any roll handling problem, the latest Towmotor lift truck offers several advantages.

The truck has a high tilting mast, equipped with an elevating scoop in place of the usual forks. In operation the forward edge of



this scoop is lowered to the floor with the mast tilted slightly forward. A "crowding" movement of the truck then forces the roll onto the scoop, and a quick backward tilting of the mast scoops the roll back into the carriage into such a position that no clamps are needed to hold it while traveling.

To stack the rolls, the load is partially elevated, the truck swung into position and the load then lifted to the required height. A quick forward tilting of the mast puts the roll in place. Stacking may be accomplished to greater heights than heretofore, thus economizing floor space.

At no time in the cycle of loading, traveling, stacking and unloading need the operator leave his

seat, or require the assistance of men on the floor or on the pile of rolls. The operator's seat is so placed as to give comfort, safety and clear vision at all times.

The truck is powered by a gasoline engine, operating a hydraulic lifting and tilting mechanism as well as the regular truck two-wheel drive. The load is carried over the driving wheels. The truck is steered by two smaller wheels set in the rear, permitting short pivot turns in close quarters. High speed in reverse allows for travel in both directions.

Overall height, lift and capacity may be governed to meet individual requirements. This truck is manufactured by Towmotor, Inc., Cleveland.

Attachments Increase Bar Bender Output

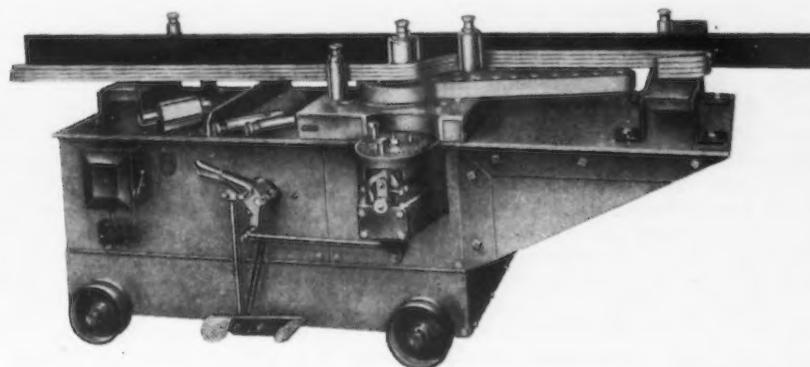
THE motor-driven automatic reinforcing bar bender marketed by the G.D.S. Shearing & Punching Machine Co., 101 Walker Street, New York, is now available with new special equipment for bending two angles on truss bars in one operation. Coupled with the automatic attachment, which causes the bending arm to always return to starting point after a bend has been completed, this feature, it is emphasized, permits marked increase in production as compared with machines that bend only one angle in one operation. The hooks on the ends of truss bars can be bent simply by reversing the bending operations, so that it is never necessary to turn the bars end for end.

Equipment No. 1 is especially designed for bending of hooks and angles on truss bars. It accomplishes the following: (1) Bends both hooks and angles on one or more bars at a time. (2) Bends

two angles in one operation. (3) Makes right and left bendings on angles or hooks, always two angles in one operation, simply by reversing the machine. (4) The bars move across the machine in one direction, not having to be turned end for end—reversed.

The machine is equipped with an automatic arrangement or dial plate on which any bending it is desired to make can be pegged and the machine caused to stop automatically and return to the starting point when the bending is completed. This arrangement assures uniformity in the bendings and accelerates production. It is of the greatest importance in connection with the operation of special equipment Nos. 1 and 4.

The bender can be equipped with various equipments to make all the bendings ordinarily required in connection with bending reinforcing bars such as stirrups, spirals, rings, bows, straightening, etc. The machines are portable and are of compact, steel plate construction with all working parts inclosed. Four sizes, for bending bars up to 2 1/2 in. are built.



NEW special equipment includes a unit for bending two angles on truss bars in one operation.

THIS WEEK ON THE ASSEMBLY LINE



... **General Motors commences to resume operations on part-time basis in non-struck plants as Washington conferences end in stalemate.**

... **Waiting period expected to test morale of sit-in strikers and to build up demands to return to work on part of unorganized majority.**

... **Chrysler cuts schedule to four-day week as glass supply dwindles, but Pittsburgh settlement should boost schedules next week.**

... **Production for the week again declines as General Motors assemblies approach the vanishing point.**

DETROIT, Jan. 25.—"In the interests of peace there come moments when conversations and headlines are not in order." Thus spoke President Roosevelt when he was challenged by reporters to declare himself on the General Motors strike situation last week. His remark well sums up one of the principal stumbling blocks to a quick solution of the automobile strike situation. Certainly any remarks that John L. Lewis made during the latter part of the week were not conducive to bringing about a meeting of minds on this grave question which is adversely affecting business throughout the country. While it is true that the CIO contributed over \$300,000 to the Democratic campaign fund, it was the height of impertinence for Mr. Lewis to sug-

gest publicly that the president pay back some of his campaign debts, the inference being, of course, that the administration should throw its weight on the labor side of this controversy.

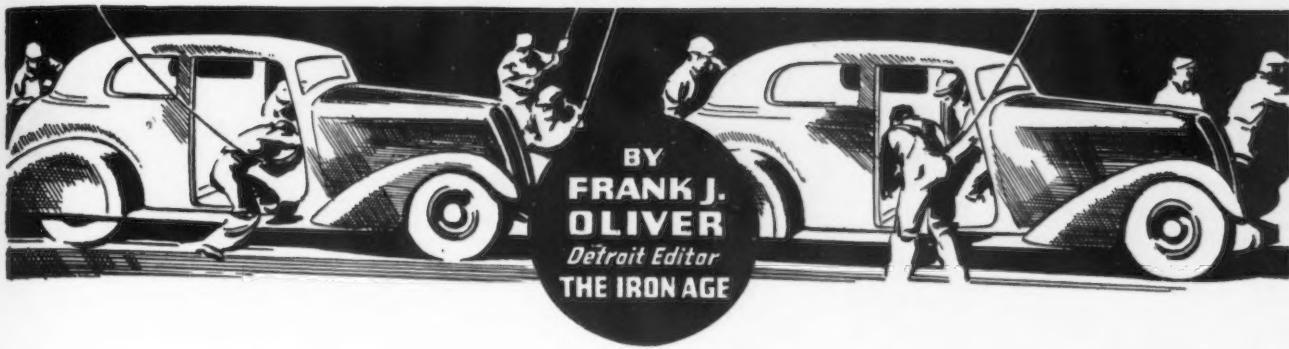
The question before everyone now is how long will the stalemate last? Informed opinion in Detroit seems to be that the element of time is the most important factor in favor of General Motors settling this affair to its advantage. There is every evidence that as time goes on the resentment of non-striking workers thrown out of jobs has been increasing. Their resentment is being backed up by local merchants who are losing business or who are being forced to accept business on credit. Only the presence of the State Militia has prevented the non-strikers from going

into the two Fisher Body plants in Flint and ejecting forcibly the sit-down strikers there. After all, in a battle of this kind it is largely a question of morale and of each side waiting out the other. It is very likely too that the sit-in workers themselves may get tired of their self-imposed hardships and walk out of the plants, thus paving the way for direct negotiations.

Alfred P. Sloan, Jr., president of General Motors, in a recent statement indicated that the corporation had agreed to all the union conditions for a general conference but that the union itself had failed to live up to its agreement to withdraw workers from the plants. He pointed out that the corporation had done everything reasonably possible in conferring with State and Federal officials, but he is equally adamant in insisting that the present deadlock could not be broken unless the corporation receives back its plants.

Property rights are at stake and William S. Knudsen made it very clear in a press interview Saturday that the corporation would never back down from that issue. No plans had then been made for a conference with anyone, upon failure to reach any conclusions with officials in Washington. Further steps toward settlement were definitely stalemated.

Efforts were being made at once to start resumption of production in all but the 17 plants that were "struck." Up to the end of last week there were only 108,000 out of an original payroll of 234,000 still at work. These include salaried workers. About 31,000 were involved in strikes, and 95,000 were out of work because of lack of



BY
**FRANK J.
 OLIVER**
Detroit Editor
THE IRON AGE

work. The intention is give about 40 per cent of these latter part-time work, even if it is only two days a week. The Chevrolet engine plant in Flint will resume operations, although Buick will not because the plant continued to operate two weeks after the assembly line went down and parts banks are high. To accomplish this end, General Motors' revolving fund of \$60,000,000 for building up parts inventory in seasonal low spots will have to be greatly augmented.

Chrysler Short of Glass

To increase the competitive pressure on General Motors, it is felt that Lewis pushed the settlement of the Pittsburgh Plate Glass strike. Chrysler worked only four days last week and this week, owing to the fact that the quantity of plate glass it was receiving was not sufficient to keep up with a five-day production schedule. With the Pittsburgh Plate Glass strike settled, Chrysler will be able to resume full production within a week since resumption of operations in the glass plant will find a large amount of safety glass in various processing stages, although it will take from three to four weeks before the furnaces are in a position to furnish molten glass. Finishing processes on rough glass can start at once. While the Libby-Owens-Ford situation has struck a snag due to wage differentials between itself and Pittsburgh Plate, this continued tie-up can have little adverse effect on either Ford or Chrysler, since L-O-F is supplying General Motors principally.

It is significant, incidentally, that in the Pittsburgh settlement

the demands for the check-off system and the closed shop, which had been the stumbling block for months, were withdrawn and to that extent represents a partial victory for the glass company, which had maintained that it would never concede these two points. The chief gains for the union were a flat raise of 8c. an hr. and the establishment of a 63c. an hr. minimum for men and 55c. for women. An interesting development in labor relations was the creation in the settlement of a commission to compromise pay differences between the two principal glass companies whenever their labor contracts are up for renewal.

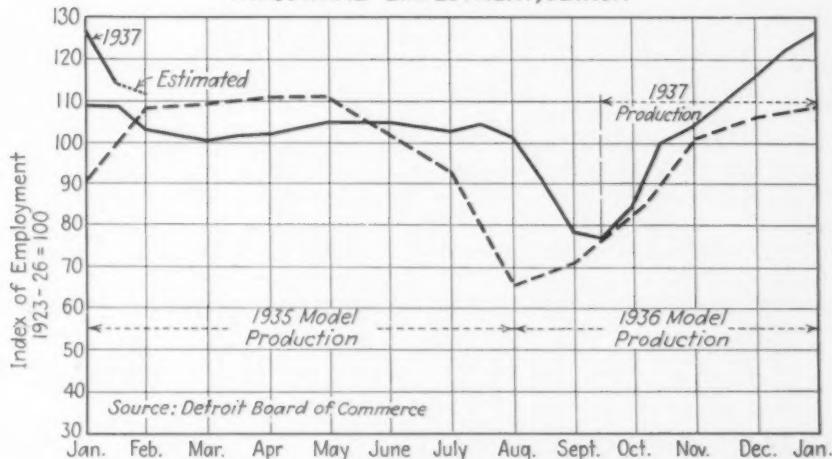
In its battle against the UAW General Motors is placing its main reliance on the fact that the majority of workers are desirous of working and that the CIO has no intention of asking for a ballot on the collective bargaining agency under the direction of the National Labor Relations Board. The cor-

poration is not empowered to ask for such an election and as a matter of policy would not care to recognize the board to this extent since the general opinion is that the Wagner Act will eventually be invalidated by the Supreme Court. Even Lewis predicts this.

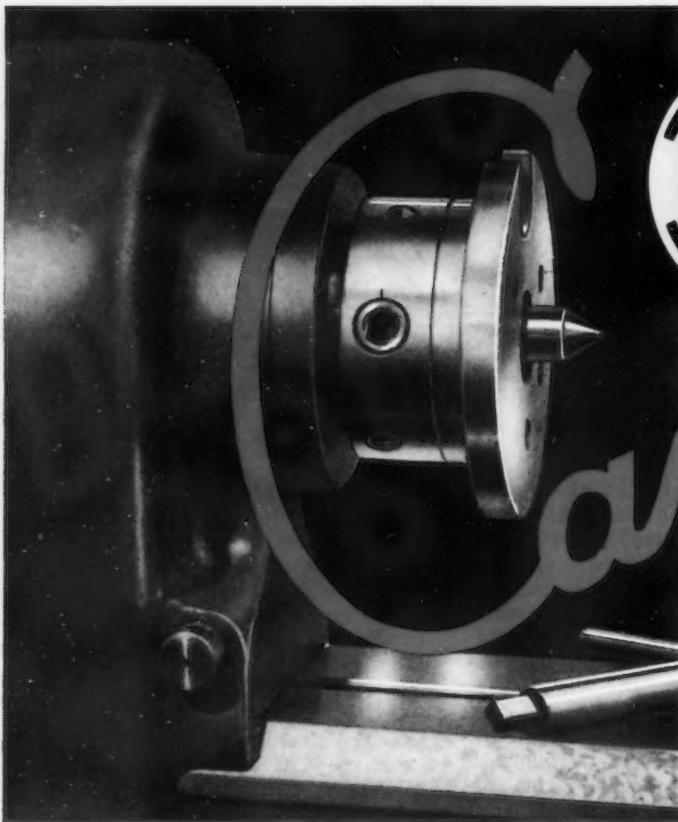
Secret Poll May Be Taken

In the meantime, action has been taken to introduce a bill in the Michigan Legislature authorizing the State Board of Canvassers to conduct a secret poll of General Motors workers to ascertain whether the strike has the support of a majority. In an informal poll, the corporation has received signed postcards to indicate that a total of 110,262 employees from 43 plants employing 139,312 people—or more than 79 per cent—protest against strikes which have forced them into idleness or imperiled their present jobs. Even at Flint, which is the hot spot of General Motors' national picture, it is re-

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Now the new Pratt & Whitney 10" x 20" Bench Lathe has the

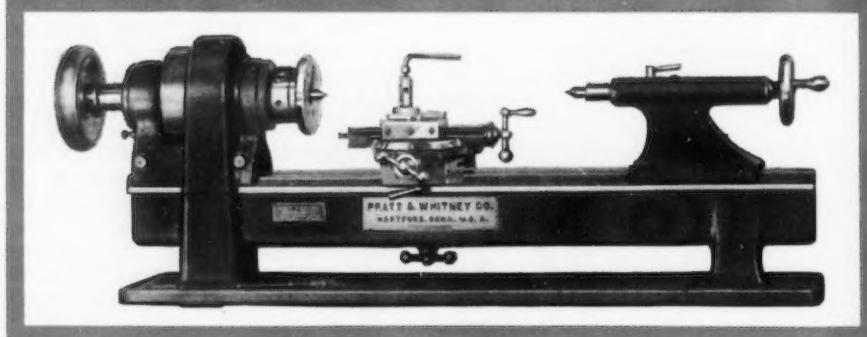


Cam-Lock
Spindle
Nose

THE many advantages of this new bench lathe already have made it an outstanding success. Now it has one more important feature—the Pratt & Whitney Cam-Lock Spindle Nose—standard on all sizes of P&W Lathes.

This new spindle nose, a Pratt & Whitney development, has the advantage of tremendous rigidity in holding the chuck or face plate on the spindle, with no possibility of it being thrown off when the spindle is stopped suddenly. Coupled with this is its permanent accuracy in holding the chuck or face plate central and square.

The new Cam-Lock Spindle Nose has all the advantages of the Standard Flange type spindle nose, with the added convenience and security of the cam-locks which have been substituted for bolts or studs. It is easier to mount or unmount a chuck on the Cam-



Lock Spindle Nose than on any other known type. There are no threads to be damaged or to catch dirt or chips which would interfere with the proper functioning of such a thread. There are no loose parts to be lost.

Write for complete details on the P&W 10" x 20" Bench Lathe—driven by the New Departure Transitorq—and now equipped with the P&W Cam-Lock Spindle Nose.

PRATT & WHITNEY DIV.
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ported that 29,908 employees in the Chevrolet, Buick, Fisher Body and A. C. Spark Plug plants, which employ a total of 37,800 factory workers, have signed the petitions. A. C. Spark Plug, incidentally, is the only plant that continued to operate in Flint last week. Doubt is thrown on these figures by the UAW, which claims that the signatures were collected by the management through coercion and the threat of loss of jobs if employees did not sign. The union claims that it issued instructions at a number of plants, including the Ternstedt Manufacturing Division in Detroit, for workers to sign the petitions in order to protect their jobs. This would only be a smart move, of course, if it were definitely felt that an informal vote of this kind was going decidedly against the union. A poll conducted under State auspices would certainly tend to crystallize public opinion, which is bound to be a potent factor in the general situation.

One interpretation of the glass settlement is that glass workers have been practically starving for some time and the bad publicity emanating from this situation was having its effect on the steel organizing drive in the Pittsburgh district. Delegations of workers' wives periodically made trips to the SWOC offices in Pittsburgh to have the strike ended. In Michigan the State continues to feed those in need whether they be strikers or non-strikers, but may soon be embarrassed by lack of funds. The State relief funds are nearing the point of exhaustion unless a deficiency appropriation is made immediately.

Ford Aids in Strike Settlement

Several significant trends have been noted in the recent settlement

of strikes in plants of parts suppliers in Detroit. On Jan. 7 the Briggs Mfg. Co. successfully staved off a sit-down strike at its Meldrum Avenue plant by forcibly ejecting the remaining few sit-downers after the original crowd had largely dispersed because of lack of enthusiasm. The plant resumed operations the following week, although picketed, and could have successfully maintained such operations had not the flying squadron tactic been employed early Tuesday morning of last week. An aggressive picket line composed largely of workers off the night shift from the Dodge plant, together with some of the more belligerent element from Flint, effectively prevented workers from entering the plant, despite the use of tear gas bombs on the part of police. Largely on the advice of the Ford Motor Co., which was an indirect party to the settlement, the company agreed to take back 350 workers who had been quietly laid off for lack of orders, but who, the union claimed, were victims of discrimination.

A day later the month-old sit-down strike in the permanent mold plant of the Bohn Aluminum & Brass Corp. was brought to a close. In this settlement Harry Bennett, chief of the Service Division of the Ford Motor Co., also played a part. Although the union claimed a great victory here, actually no recognition was offered the UAW. Instead, a public statement was merely issued to all former employees inviting them back to work on the basis of a 65c an hr. minimum for men and 50c for women. This was rather a hollow victory for the union, since up to the time of the strike no male production workers were earning less than 70c an hr., even though lower minimums were standard. The sad

commentary on this whole situation, which involved the loss of work for 500 employees for four weeks, was that it was started solely over the alleged discharge of one man for union activity. Thirty-five men and women held the fort during this period and refused to evacuate on that principle. This makes the fifth plant in Detroit in which the Ford Motor Co. has intervened in the settlement of labor difficulties. In every case, raising of the minimum wage rate has been urged as the solution for the problem.

Automotive Output Lower

Automotive production in the week ended Jan. 23 declined as a result of the controversy between General Motors and the UAW. Ward's Automotive Reports estimates the week's production at 72,509 passenger cars and trucks in the United States and Canada, compared with 85,703 the week before and 92,689 in the corresponding period of last year. General Motors volume declined to 7450 cars as against 15,300 the week before. Because of the four-day week as a result of glass shortage, Chrysler units produced only 22,400 cars, compared with 26,850 the previous week. Ford production dropped slightly to 27,165 as a result of a one-day shutdown of the Lincoln-Zephyr plant, brought on by the Briggs strike at their Meldrum Avenue plant. Chrysler will probably operate on a four-day schedule this week, but should be able to resume normal operations next week. Ford is continuing to push production to the limit and is striving to attain its budgeted goal of 130,000 assemblies in January. Steel companies are being pressed for delivery on material to this plant and there is no sign of a let-up.

• • •

THIS is the season for new truck announcements. Pictured is the new two-ton Dodge truck which features booster operated hydraulic brakes, improved and stronger frame and rear springs increased 4 in. in length. Cabs have been made stronger by the increase of gage of some of the stampings and added metal bracing.

• • •



Current Metal Working Activity Statistically Shown

These Data Are Assembled by The Iron Age from Recognized Sources and Are Changed Regularly as More Recent Figures Are Made Available.

	December, 1936	November, 1936	December, 1935	Year, 1935	Year, 1936
Raw Materials:					
Lake ore consumption (gross tons) ^a	4,551,379	4,269,049	3,100,530	30,857,852	44,639,318
Coke production (net tons) ^b.....	.....	4,288,392	3,488,818	35,209,240	*41,708,432
Pig Iron:					
Pig iron output—monthly (gross tons) ^c	3,115,037	2,947,365	2,106,453	21,007,802	30,618,797
Pig iron output—daily (gross tons) ^c	100,485	98,246	67,950	67,555	83,658
Castings:					
Malleable castings—production (net tons) ^d.....	.....	50,934	45,598	466,395	*510,022
Malleable castings—orders (net tons) ^d.....	.....	58,152	42,573	452,611	*509,299
Steel castings—production (net tons) ^d.....	.....	68,874	37,793	398,988	*722,075
Steel castings—orders (net tons) ^d.....	.....	76,394	40,529	400,157	*749,650
Steel Ingots:					
Steel ingot production—monthly (gross tons) ^e	4,431,645	4,337,412	3,073,405	33,417,985	46,919,352
Steel ingot production—daily (gross tons) ^e	170,448	173,496	122,936	107,453	150,383
Steel ingot production—per cent of capacity ^e	77.66	79.05	55.53	48.54	68.52
Finished Steel:					
Trackwork shipments (net tons) ^f	5,579	4,756	3,025	42,229	68,813
Steel rail orders (gross tons) ^f	125,290	123,875	88,100	533,120	1,053,230
Sheet steel sales (net tons) ^g	336,758	294,080	203,318	2,473,489	2,720,330
Sheet steel production (net tons) ^g	230,581	224,031	208,774	2,424,990	2,598,140
Fabricated shape orders (net tons) ^h.....	.....	117,798	96,235	1,068,603	*1,429,348
Fabricated shape shipments (net tons) ^h.....	.....	128,306	76,214	1,095,216	*1,413,352
Fabricated plate orders (net tons) ^h.....	.....	40,519	35,584	258,315	*431,148
Reinforcing bar awards (net tons) ^h	18,550	18,740	29,025	318,340	334,790
U. S. Steel Corp. shipments (tons) ⁱ	1,067,365	882,643	561,515	7,371,299	10,825,132
Ohio River steel shipments (net tons) ⁱ	111,450	127,425	61,666	926,174	1,169,321
Fabricated Products:					
Automobile production, U. S. and Canada ^k	519,132	394,890	418,317	4,119,811	4,616,857
Construction contracts, 37 Eastern States ^l	\$199,695,700	\$208,204,200	\$264,136,500	\$1,844,544,900	\$2,675,296,000
Steel barrel shipments (number) ^d.....	.....	733,215	541,375	6,872,452	*7,653,994
Steel furniture shipments (dollars) ^d.....	.....	\$1,645,626	\$1,558,095	\$15,523,679	*\$17,132,963
Steel boiler orders (sq. ft.) ^d	1,872,139	937,437	684,735	6,245,158	11,679,614
Locomotive orders (number) ^m.....	.....	174	2	83	*354
Freight car orders (number) ^m.....	.....	1,550	10,030	18,699	*40,208
Machine tool index ⁿ	257.7	147.1	98.3	+99.9	+180.4
Foundry equipment index ^o.....	.....	200.4	118.1	+119.5	+178.5
Foreign Trade:					
Total iron and steel imports (gross tons) ^p.....	.....	61,970	93,678	469,954	*614,254
Imports of pig iron (gross tons) ^p.....	.....	10,615	16,289	130,937	*155,486
Imports of all rolled steel (gross tons) ^p.....	.....	20,656	21,812	216,567	*250,626
Total iron and steel exports (gross tons) ^p.....	.....	203,297	239,269	3,067,336	*2,923,502
Exports of all rolled steel (gross tons) ^p.....	.....	123,159	85,590	897,749	*1,046,035
Exports of finished steel (gross tons) ^p.....	.....	100,344	78,625	767,456	*927,800
Exports of scrap (gross tons) ^p.....	.....	69,113	142,135	2,047,290	*1,778,685
British Production:					
British pig iron production (gross tons) ^r	671,400	643,100	559,300	6,425,000	7,681,600
British steel ingot production (gross tons) ^r	1,019,200	1,001,300	811,500	9,842,400	11,699,000
Non-Ferrous Metals:					
Lead production (net tons) ^s	47,085	43,831	42,020	421,764	463,187
Lead shipments (net tons) ^s	51,646	50,313	42,333	433,456	512,975
Zinc production (net tons) ^t	47,050	45,742	40,550	431,499	524,271
Zinc shipments (net tons) ^t	59,821	57,107	42,058	465,746	563,273
Deliveries of tin (gross tons) ^v	6,930	5,345	5,360	59,110	74,005

*Eleven months' total. [†]Three months' average.

Source of figures: ^a Lake Superior Iron Ore Association; ^b Bureau of Mines; ^c THE IRON AGE; ^d Bureau of the Census; ^e American Iron and Steel Institute; ^f National Association of Flat-Rolled Steel Manufacturers; ^g American Institute of Steel Construction; ^h United States Steel Corp.; ⁱ United States Engineer, Pittsburgh; ^j When preliminary, from Automobile Manufacturers Association—Final figures from Bureau of Census; ^k F. W. Dodge Corp.; ^l Railway Age; ^m National Machine Tool Builders Association; ⁿ Foundry Equipment Manufacturers Association; ^o Department of Commerce; ^p British Iron and Steel Federation; ^q American Bureau of Metal Statistics; ^r American Zinc Institute, Inc.; ^s New York Commodities Exchange.



Weekly Index of Rate of Activity in Capital Goods, Adjusted for Seasonal Variation, 1925-27 Average = 100

THE IRON AGE Weekly Index Numbers of Capital Goods Activity
(1925-27 Average = 100)

Last week	89.8	Same week 1933	39.4
Preceding week	93.3	Same week 1932	44.3
Same week last month	98.4	Same week 1931	70.5
Same week 1936	78.7	Same week 1930	95.3
Same week 1935	61.4	Same week 1929	126.8
Same week 1934	53.2		

THE general business level in capital goods continued to fall off last week, as, although some industries increased operations, the expansion in most cases was less than seasonal. This happened because of the high operating rate at which industry entered the year. In terms of the 1925-27 average of conditions, the industrial pace last week was at 89.8 per cent of normal, against 93.3 per cent for the preceding week and 78.7 per cent for the corresponding period of 1936.

The amount by which THE IRON AGE's general

index declined from the preceding week was accordingly 3½ points, but in large measure this decrease was caused by a further appreciable contraction in volume of motor car production as a consequence of the labor strike. The steel industry, on the other hand, expanded its output, but not sufficiently to equal the customary increase which occurs at this season. Lumber shipments and construction activity, however, accounted for some gain, though this was about counterbalanced by a drop in industrial activity at Pittsburgh.

Components of The Index (1) Steel Ingot Production Rate, from THE IRON AGE; (2) Automobile Production, from Ward's Automotive Reports; (3) Revenue Freight Carloadings of Forest Products, from Association of American Railroads; (4) Industrial Productive Activity in Pittsburgh District from Bureau of Business Research of University of Pittsburgh; (5) Heavy Construction Contract Awards, from *Engineering News-Record*.

Lloyd's Shows Shipping Increase

CONTINUANCE of the upward trend in the world production of merchant vessels is shown by the 2,251,000 gross tons reported by Lloyd's Register of Shipping as under construction at the end of the Dec. 31 quarter. This figure represents a gain of 140,000 gross tons over the previous quarter, which closed Sept. 30. All

merchant vessels of 100 gross tons and over being built throughout the world, except in Russia, are covered by this survey.

With the exception of Germany and Denmark, all the leading maritime nations showed advances in ship production during the quarter just ended. For Great Britain and Ireland the gain was 35,000 gross tons, compared with an increase of 20,000 tons for the United States and of 86,000 tons for the other countries, taken as a group.

Construction comparisons are as follows:

	Dec. 31, 1936	Sept. 31, 1936
Great Britain and Ire- land	963,642	928,571
United States	110,356	90,960
All others	1,177,223	1,091,926
	2,251,221	2,111,457

Of the entire current production, Lloyd's Register points out, approximately 43 per cent is being constructed in Great Britain and Ireland, 5 per cent in the United States and 52 per cent in other countries.

WASHINGTON.



... *Despite breakdown in General Motors strike negotiations, Secretary Perkins will try another conference.*

... *"Consummate arrogance" of John L. Lewis causes stalemate in efforts to bring about industrial peace.*

... *Governor Murphy of Michigan also making further efforts; may propose a vote under the Wagner Act.*

By L. W. MOFFETT
Resident Washington Editor,
The Iron Age

WASHINGTON, Jan. 26.—Just as a cold, driving rain poured upon him as he again swore fealty to the Constitution of the United States last Wednesday, so did President Franklin Delano Roosevelt face ominous labor storm clouds whose potential fury, many think, is unprecedented. But it is not unusual for the uncertain elements of nature in Washington inauspiciously to usher a President into office and their misbehavior as Mr. Roosevelt was launched upon his second term could be accepted as a symbolism only by the superstitious.

Nevertheless, this first January Presidential inauguration was matched in its weather-made dreariness by a drab labor outlook that grew darker as the President was telling the country that "We are moving toward an era of good feeling. But we realize that there can be no era of good feeling save among men of good will."

Even as he was uttering these words in his inaugural address, intense efforts were under way in Washington to bring about peace in the General Motors strike only to result in climactic collapse 36 hr. later when John L. Lewis, head of the Committee for Industrial Organization, stormily rejected overtures which Secretary of Labor Frances Perkins and Gov. Frank M. Murphy of Michigan eagerly sought at separate conferences they held with high General Motors officials and Lewis.

Lewis is reported to have been urged in vain to agree to the withdrawal of sit-down strikers in the Fisher Body plants at Flint, Mich., as a preliminary to reopening of peace negotiations previously undertaken at Lansing, Mich., by Governor Murphy, but which broke down when President Homer Martin of the United Automobile Workers, CIO affiliate, breached his promise to have the plants evacuated. President Alfred P. Sloan, Jr., had made it clear to Miss Perkins that removal of the strikers from General Motors plants was absolutely essential before negotiations would be resumed. Likewise he stood fast in his refusal to yield to the Lewis-Martin demand that the UAW be recognized as the "exclusive bargaining agency" in the General Motors Corp.

Lewis Reprimanded

Rushing further in his unrestrained zeal for power, Lewis at a press conference Thursday evening, eager to gain his objective of laying his unionization drive at the White House door, virtually demanded Presidential intervention and thereby drew what is generally construed as a reprimand from the President, denials to the contrary notwithstanding. It marked a highly significant development, one that long has been considered inevitable by those who have predicted a difference between the President and Lewis was bound to eventuate. As it stands now, it

certainly cannot be called an open breach. Rising criticism of Lewis's tactics was to the general effect that he was seeking to make a check-off station of the White House in return for CIO political support he rallied back of the President in the recent campaign.

That the President was disturbed over the situation was made evident by the fact that he did the uncommon thing of authorizing direct quotations when asked about it at his press conference Friday morning.

"Of course, I think, in the interest of peace, there come moments when statements, conversations and headlines are not in order."

Lewis had said the preceding evening at one of his numerous press conferences:

"We have advised the Secretary of Labor that the 'economic royalists'—and the duPonts and Mr. Sloan are among them—used their money to try to drive Mr. Roosevelt out of the White House.

"The administration asked labor to help repel the attack.

"The same 'economic royalists' have their fangs in labor and labor expects the administration to support it against the same rapacious enemy."

Lewis' Blast Ends Negotiations

This blast by Lewis put the final touch on efforts at peace negotiations. A few hours later President



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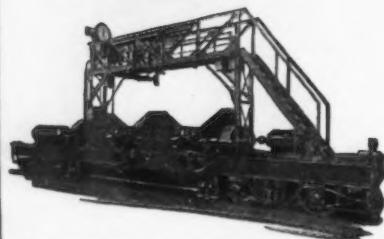
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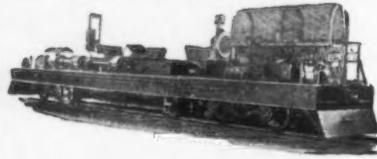
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20 Ton Capacity Double Compartment Scale Car for use with Orr type Bin Gates controlled from Operator's Station on Scale Car.

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Sloan and other General Motors officials departed for New York and soon thereafter Governor Murphy returned to Lansing. Before leaving Washington, Mr. Sloan said he would return immediately to Washington if he were called by the President. Despite the obvious White House hope that it will not be called upon to intervene in the General Motors as well as the general CIO labor situation, the view is common that ultimately that will be necessary. Governor Murphy said in Washington that he was convinced the General Motors strike would have to be settled "in the East." But in view of developments White House intervention, if it does come about, may not be as desirable as the CIO group had hoped.

In contrast to his virulent attacks on the "economic royalists," Lewis, evidently chagrined, commented in mollifying terms on the President's statement.

"I don't believe, as some have suggested," said Lewis, "that the President intended to rebuke the working people of America who are his friends."

Of course Lewis knows that from no source was there even a remote suggestion that the President had rebuked the working people of America. It was just his crude way of trying to get out of a jam, but trying without success. The view was expressed that Lewis finally realized he had overplayed his hand and fears a serious threat to his perilous industrial unionization campaign.

From New York, Mr. Sloan issued a statement saying that the statement made by the "union leader" (Lewis) indicates clearly his determined will to dominate the industry and its workers by illegality and force. His statement apparently indicated General Motors would attempt to reengage some workers now out of employment through no fault of their own. Miss Perkins said that Governor Murphy had returned to Michigan where he might be of more help in the peace negotiations. She did not amplify the statement. There were reports, however, that Governor Murphy might seek to bring about an election at the hands of the National Labor Relations Board. Lewis and Martin are reported to be opposed to such an election. The reason apparently is that they know they cannot justify the contention that UAW representation in General Motors plants is in the majority. They claim about 75 per cent. Mr. Sloan, on the other hand, claims 79 per cent of General Motors employees do not belong to the organization. The CIO evidently fears the strength of craft unions.

UAW sit-down strikes have thrown 135,000 out of employment in General Motors plants at a daily wage loss of \$1,000,000, most of the workers being non-members of the UAW and therefore coerced into idleness and loss of a means of livelihood. Growing protests are coming from these workers and many have been sent to the White House. The actual idleness resulting from the General Motors strike manifestly is much larger than that in that organization itself. Far flung supplying sources are of course affected and have already been reflected to some degree in steel.

Threat To Recovery

These far reaching implications of the situation obviously are seen in Washington and are the subjects of White House and cabinet discussions. The threat to recovery stands out like a sore thumb. Likewise the threat to a balanced budget as well as the threat of increased spending for relief requirements to provide for the unemployed and their families. The administration realizes it is at grips with its most portentous situation which cannot be prolonged. It is realized that early and definite action either by the national administration or state authorities appears to be imperative.

Nevertheless, Lewis continues to force the issue. As if in response to the President's statement, soon after it was issued, Lewis, at another press conference, read a long telegram of "encouragement" to the sit-down strikers in the Flint plants in which he again attacked General Motors officials and urged the workers to carry on. With him at the time were President Martin and Vice-President Wyndham of the UAW.

To War on Ford and Chrysler

Previously, Lewis has indicated he was preparing to wage a unionization drive in the Ford and Chrysler plants, declaring that "as soon as General Motors signs up I expect Mr. Henry Ford and Mr. Walter Chrysler to do a little collective bargaining." He went on to say that there would be "no half-baked compromise in automobiles or steel." But after the President had issued his statement, Lewis's reflected more moderation in his immediate ambitions. Asked if he was conducting a drive to unionize the Ford plants, Lewis replied he is now busy with the General Motors plants. His remarks about unionizing the Chrysler plants created comment. Reported to be substantially organized by the UAW, Lewis hitherto

praised the Chrysler organization in connection with collective bargaining. Significance was attached to the fact, however, that shortly after Lewis made this statement signs were put in Chrysler plants saying it was not necessary to belong to any labor organization in order to get employment. Lewis is said to have resented this action as striking at the CIO.

"I don't want to embarrass the administration" was the rather weak remark Lewis made in denying he had asked Presidential intervention in the General Motors strike situation.

"Have they embarrassed you?" he was asked, as news correspondents broke out in laughter.

"No," Lewis replied, "We have ample confidence that in the end the President will do what is necessary. We have full confidence in him. We've shown that. You know how."

It was assumed Lewis's "how" referred to political support and large contributions from his organized labor groups.

In any event Senator Rush Holt, Democrat, of West Virginia, who does not like Lewis, placed this interpretation on Lewis's remark.

The only member of Congress to comment publicly on the labor situation, Holt attacked Lewis's effort to get Presidential support as "most brazen." Other sources said it was "consummate arrogance."

"Why should an issue as important to the economic life of America be settled by political consideration?" Holt inquired. "Certainly it should not be a question of party support, but a question of right and wrong. The statement of Lewis is typical of the man. If given the power, he will continue such demands upon all public officials that he has supported. That is his philosophy. He believes that support, particularly financial, in an election, is an investment for future control."

Meanwhile the Senate Committee which is investigating campaign spending is considering recommendations, drafted by Chairman Lonergan, Democrat, of Connecticut, which would bar contributions to political campaign funds by "labor organizations and other groups." It will be interesting to see what, if anything, is done with the proposed law.

Late Bulletins

For a general résumé of what transpired at the President's conference with General Motors officials and CIO leaders late Tuesday afternoon, consult the late dispatch on page 70.

Carnegie-Illinois Hearing Resumed

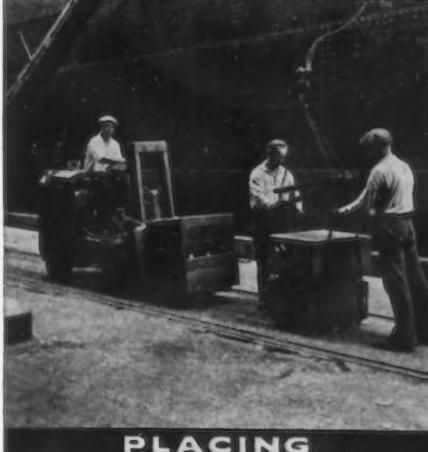
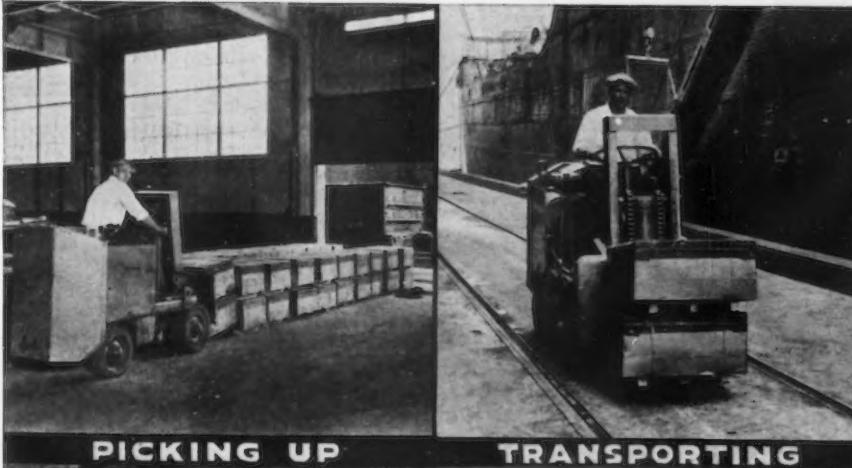
WASHINGTON Jan. 26.— Hearings before Trial Examiner Charles A. Wood, of the National Labor Relations Board in the Carnegie-Illinois Steel Corp. case were resumed yesterday with Elmer J. Maloy, former employee representative of the Duquesne, Pa., and prominent Steel Workers'

Organization Committee promoter, recalled for questioning by George O. Pratt, attorney for the board. The testimony largely concerns the method of the handling of employee meetings and Maloy, ousted as employee representative chairman of the Pittsburgh General Council, declared he had not the privilege of approving the minutes, as committee chairman, except for a period of about one month.

Maloy said that delegates to a committee conference Oct. 12-14

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were paid their regular hourly rate and expenses for attending these meetings and identified the draft of a proposed amendment to the employee representation plan. He said it had been adopted "article by article" by the general group consisting of two delegates from each of the steel plants represented at the conference. The proposed amendment, he said, was submitted for management consideration. Subsequently, Maloy stated, John Patterson, a lawyer for the company, "came back in a few minutes, right before the entire body had adjourned, and changed the wording of some of the paragraphs to make them more explicit."

Maloy said the amendment was approved by the general employee body at the Duquesne plant because "it provided for compulsory arbitration." Later it was ratified by all of the plants except Homestead.

Management representatives, Maloy said, have no authority to act on their own initiative.

"Do I infer from that that the management representatives act in the capacity of messengers between the employee group and those of management who really have power?" inquired Examiner Wood.

"That is what we consider them, as messenger boys for the management," replied Maloy. "In every wage request that I have had I have been told by the man-

agement representatives that even if the general superintendent approved that request, it would have to be submitted to the Pittsburgh office for approval before it could go into effect, and it might be rejected after it had even the general superintendent's approval."

O'Mahoney Licensing Bill Up for Hearing

WASHINGTON, Jan. 26.—Hearings on the bill of Senator O'Mahoney, of Wyoming, requiring Federal licensing of corporations were begun yesterday before a subcommittee of the Senate Judiciary Committee and marked the opening of a drive for legislation to fix wage and hour standards. While the administration has clearly said it proposes such legislation at the present session of Congress, it has not publicly indicated its position toward the O'Mahoney bill. The belief is that, whether it may or may not accept the principles of the bill, the administration will offer its own program independently of this legislation. Present intimations are that it may await decision by the Supreme Court on the Wagner Labor Act or at least withhold enactment of legislation until that decision has been handed down.

Arguments on the act are to begin the week of Feb. 8, the first cases involving that of the Jones & Laughlin Steel Corp., appealed

by the National Labor Relations Board when it lost its case against the steel company at New Orleans, the Federal Circuit Court holding that the act was unconstitutional. The board attempted to enforce recognition of the Amalgamated Association of Iron, Steel and Tin Workers as an exclusive collective bargaining agency and reinstatement of discharged workers. The court held that manufacturing is intrastate and that therefore the board was without authority.

Under the O'Mahoney bill industry would be denied licenses to incorporate unless it accepted standard wage and hour levels and recognized collective bargaining as required by the Federal government. The measure has been strongly endorsed by organized labor. John T. Flynn, New York writer on economics, the first witness before the subcommittee, also favored it.

Mesabi Ore 69.65% Of Total Movement

RON ore shipped from the Mesabi Range in 1936 comprised 69.65 per cent of the water movement as compared with 66.58 per cent in 1935 and with 67.07 per cent in 1934, as is shown by a report prepared by the Lake Superior Iron Ore Association.

Non-bessemer ore shipped increased to 74.58 per cent of the total, compared with 71.48 per cent in 1935 and 70.74 per cent in 1934. The percentage of bessemer ore shipped declined to 20.35, compared with 23.19 per cent in 1935 and with 23.28 per cent in 1934. Of the total shipments amounting to 44,373,709 tons, bill of lading weights, the non-bessemer grade accounted for 33,095,687 tons and the bessemer grade for 9,034,089 tons.

The Gogebic range replaced the Marquette range for the second place in volume of shipments and the Cuyuna range moved up to fifth position, replacing the Vermilion range.

TOTAL 1936 MOVEMENT OF ORE

By Grades

	Tons
Bessemer	9,034,089
Non-bessemer	33,095,687
Manganiferous	1,383,451
Silicious	860,482

Movement by Ranges

Mesaba	30,909,139
Marquette	4,460,404
Gogebic	4,577,370
Menominee	2,150,102
Cuyuna	1,257,275
Vermilion	1,019,419

Total 44,373,709

Fully Automatic, High Speed Production Sawing Machines

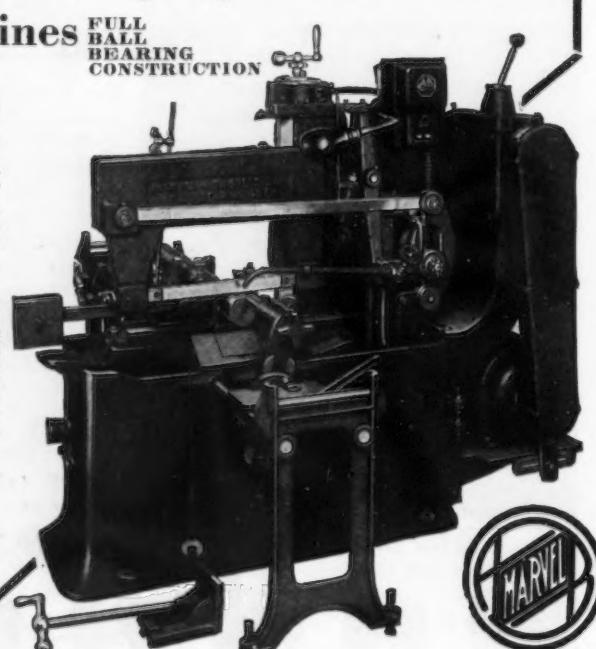
MARVEL No. 6A No. 9A

Do your sawing *Automatically*—with speed! These new MARVEL automatics go through steel up to four sq. inches per minute. Cut cutting-time and cutting costs to a fraction.

Easily set up, they Feed, Measure, Cut, Count and Stop, *automatically*—do the work of several saws and men. They are fast, accurate, dependable. Will keep well ahead of production lines. No. 6A, capacity to 6" x 6". No. 9A, capacity to 10" x 10". Write for Bulletin No. 600.

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A. I. M. E. to Meet at New York, Feb. 15

THE 147th meeting of the American Institute of Mining and Metallurgical Engineers will be held from Monday to Thursday, Feb. 15 to 18, at the Engineering Societies Building, 29 West Thirty-ninth Street, New York. As in past meetings, a number of pertinent technical papers will be presented by leaders in the metallurgical and mining professions.

The Iron and Steel Division has two sessions scheduled on Tuesday afternoon, one devoted to crystallization, the other a joint meeting of the division's blast furnace and raw materials committee with the institute milling methods committee (flotation as applied to iron ores); Wednesday morning, ingot solidification, and in the afternoon, gases in steel; Thursday morning, iron-carbon equilibrium diagram; Thursday afternoon, general ferrous metallurgy; Thursday at 4 p. m., the Howe Memorial Lecture, "Alloy Cast Iron," by Dr. P. D. Merica, vice-president of the International Nickel Co. The session on ingot solidification will include papers describing interesting work on the mode of solidification and of the segregation in rimmed steel ingots. At the gases in steel session there will be presented the final report of the international cooperative study of methods of determining oxides, that has been sponsored by the division for several years past. Correlated papers on gases and oxides in steel and in pig iron will also be presented at this time. Attention of iron and steel division members is directed specifically to the Tuesday morning session of the milling methods committee, which will deal with E. W. Davis' paper on magnetic roasting of iron ores.

A special feature of the Institute of Metals Division will be a paper by C. S. Barrett giving a concise and simple explanation of the fundamentals of stereographic projection in metallurgy, covering applications of importance in physical metallurgy and metallography. This review is designed especially for those metallurgists, both young and old, who may either be dismayed or curious at the frequently recurring appearance of stereographic projection in metallurgical literature. Other papers at the same session (Wednesday morning, orientation) deal respectively with magnesium and lead alloys, and the peritectic transformation in the copper-zinc system. For Wednesday afternoon, there are papers describing studies of silver alloys for

piston ring holders, fatigue properties of copper alloys, and the properties of alloys of cadmium and mercury with nickel. On Thursday morning (deformation), there will be reports on creep testing and on the elastic properties of single crystals of high-purity aluminum, silver and zinc, as well as studies of stress-strain relations in the tension testing of metals. The Thursday afternoon session on general physical metallurgy includes studies of diffusion, the kinetics of trans-

formation in solid solutions and the physical-chemical properties of alloy systems. The annual lecture will be delivered at 4 p. m. Wednesday by Dr. R. S. Hutton of Cambridge University; his subject will be "Refractories."

The annual dinner will be held at the Waldorf-Astoria Hotel, Feb. 17, and John M. Lovejoy, president, will preside as toastmaster. The William Lawrence Saunders Medal will be presented to Erskine Ramsay and the Anthony F. Lucas



THE new 1937 Series of Back-Geared, Screw Cutting South Bend Precision Lathes with Double Wall Aprons and hardened and ground headstock spindles are recommended for the finest and most accurate work in the tool room, machine shop, manufacturing plant, and laboratory. These new lathes are offered in sizes 9" to 16" swing, in bed lengths from 3' to 12', Motor Drive and Countershaft Drive.

Catalog No. 96 shows the new Series "R" South Bend Precision Lathes in all sizes and styles. A valuable book for the shop man, engineer, and plant executive. Sent free, postpaid, upon request. A post card will bring it.

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Medal to J. Edgar Pew. The certificate of Honorary Membership probably will be presented to a candidate whose name is now before the committee on honorary memberships. W. F. Holbrook and T. L. Joseph will receive the Robert W. Hunt Prize and to J. M. Hassler will be tendered the J. E. Johnson, Jr., Award. The Class of 1887 Legion of Honor men will be welcomed and the new president will be introduced.

World's Fair to Use 30,000 Tons of Steel

THE 30 large buildings which the New York World's Fair Corp. expects to erect on the site of the fair grounds in Flushing Meadow Park, Long Island, will require upward of 30,000 tons of steel, according to a statement from the corporation's offices. Considerable additional amounts of steel will probably be used, as the above figure does not include estimates for buildings which may be erected by foreign countries and concerns other than the World's Fair Corp., or for subway construction for the improvement of transportation facilities to the fair site.

Preliminary estimates of construction requirements disclose that 500,000 tons of materials will be used to build 17 miles of roads, more than 30 miles of sewers, and

the buildings, which will include 3,000,000 sq. ft. of floor space, or about 70 acres. Also 15 miles of water mains, 15 miles of electrical ducts and 34 miles of walks will be laid. To make all these a reality will require, in addition to the steel, 2,800,000 lin. ft. of piling up to 110 ft. in length, 15,000,000 board ft. of lumber, 130,000 tons of sand, gravel and crushed stone, and 108,000 tons of paving materials. Other requirements (in tons) will be:

Pipe, steel and iron.....	2,900
Pipe, tile	4,500
Lighting equipment	9,000
Plaster board (12,000,000 sq. ft.)	12,000
Roofing (3,500,000 sq. ft.)	9,000
Flooring (3,500,000 sq. ft.)	4,000
Masonry materials, tile, brick.....	2,000
Mechanical and hydraulic equipment	6,200
Landscaping, trees, hedges.....	10,700
Landscaping, fertilizer	20,500
Miscellaneous	30,000

While the construction program will not get fully under way until grading of the site is completed next spring by the Park Department, a considerable amount of preparatory work is scheduled for the next three months. This work will include borings, test piles, bridges, water mains, tree planting and temporary roads. The largest contract during this period will be for the pile foundations of the \$900,000 Administration building, final architectural drawings for which were made public recently. Designed as a pre-fair work place for the center of the corporation's widening business activities, this building will provide 57,000 sq. ft. of floor space for

offices and workrooms, exclusive of the executive suites and an octagonal hall for the corporation's showroom. The foundation contract will be awarded within a few weeks, while a general contract for the superstructure will be advertised in February. Occupancy of the building is scheduled for late August.

All major construction contracts for the fair will be awarded after competitive bidding by prequalified bidders, according to Grover Whalen, president of the corporation. The decision to let fair work to prequalified contractors on a competitive basis was reached by the board of directors after careful consideration, Mr. Whalen said, and has been incorporated into the by-laws of the company. Prequalification forms may be obtained at the fair offices in the Empire State building, New York, or by writing to the corporation. Qualification will be based upon prior performance and reputation, available plant and financial ability.

Mr. Whalen estimates about 30,000 freight cars will be needed to transport the construction materials to the fair site and to deliver 100,000 tons of exhibits. He also disclosed that about 5000 applications had been received for concession privileges and that 1150 prospective exhibitors had already visited the fair offices to make first-hand contacts.

In discussing the problem of traffic and transportation, Mr. Whalen, who plans to provide facilities for handling as many as 800,000 persons daily, said, "The World's Fair site will be served by the three large rapid transit subway systems which gridiron the residential and business districts of Manhattan, Brooklyn, Bronx and Queens, and by the suburban service of the Long Island Railroad. Present facilities will be enlarged by the use of the third, or express track, on the Flushing branch of the I.R.T.-B.M.T. subway, and by the completion of the four-track system of the Independent subway along Queens Boulevard. The addition of an extension of the Independent subway from its Forest Hills yard to the heart of the fair grounds would connect all of the districts of New York City and the fair with high-speed rapid transit express service connecting directly with every rapid transit facility in the city."

A joint resolution prepared by the Board of Transportation and the Board of Estimate estimates the cost of these transportation

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improvements at a total of \$1,850,000.

The construction program of the fair will be financed with the proceeds of the \$27,829,500 debenture issue which is being floated by the New York World's Fair Bond Sales Committee, 41 Broad Street, New York.

G. E. Welding Service Set Up in Ohio Area

GENERAL ELECTRIC CO., Schenectady, N. Y., has organized a new welding engineering service which makes the services of a group of highly trained welding engineers available to industry in Ohio, parts of western Pennsylvania, and in Kentucky. Members of this organization will be located in the offices of the company in Cleveland, Columbus and Cincinnati, under the supervision of H. O. Westendarp, Jr., who has been a General Electric welding specialist for several years.

Mr. Westendarp will be located at 4966 Woodland Avenue, Cleveland, together with two other welding engineers, to cover northern Ohio and the territory surrounding Erie, Pa. The Columbus representative will be located at 40 South Third Street and will serve the central part of the State. The southern section of Ohio and the State of Kentucky will be covered by two engineers with headquarters at 215 West Third Street, Cincinnati. Members of this engineering service will assist industrial plants in solving problems involving the proper application of the various welding processes, the redesigning of parts to be fabricated and the selection of the right welding equipment and electrodes to insure the most satisfactory results.

Lewis Foundry Building Addition

REFLECTING increased demand for steel mill equipment, the Lewis Foundry & Machine Co., a subsidiary of Blaw-Knox Co., is building extensions to its plants at Groveton, Pa., to provide additional space for its roll foundry, pattern shop, machinery castings, and shop for the building of rolling mills and mill equipment. Included in the addition will be a new research laboratory to be used by the entire Blaw-Knox organization. The laboratory will be equipped for both physical and metallurgical experimental work.

Steel Engineers To Meet Feb. 25

THE Association of Iron and Steel Engineers will hold a national meeting Thursday, Feb. 25, in Youngstown, in the ball room of the Ohio Hotel. There will be technical sessions in the morning at which subjects on "Manufacture and Use of Rolls in the Steel In-

dustry," "Ward Leonard Control for Blooming Mill Auxiliary Drives," and "Continuous Pickling Tank Construction" will be discussed.

In the afternoon buses will take the guests to the Campbell works of the Youngstown Sheet and Tube Co., where they will inspect the continuous hot and cold strip mills and other late installations at this plant.

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LOGICAL because Wyckoff Cold Drawn Steels enable you to reduce machining operations and thus cut dollars from production costs and add them to profits. It is the one kind of steel that meets the most exacting standards as to accuracy of size and shape . . . uniformity of cross section . . . straightness and smooth finished surface—a refined steel that combines precise physical and chemical analyses.

In addition to the standard Wyckoff Rounds, Squares and Hexagons, we have a most complete line of special shapes including wide Flats up to 12" x 2".

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Steel Program On the Radio

THE Jan. 30 program in the Department of Commerce series over the Columbia Broadcasting System will be devoted to the steel industry. The half-hour program—running from 3.30 to 4 p. m. Eastern Standard Time—will include appropriate musical numbers as well as a talk in popular vein on the steel industry.

Ocean Liner Bids Due April 1

ASKED on behalf of the United States Lines, Inc., the Maritime Commission has called for bids by April 1 on a new ocean liner to replace the Leviathan in trans-Atlantic service. The new vessel will require from 16,000 to 20,000 tons of steel, depending on whether the ship will be a sister ship of the Manhattan of 24,000 gross tons or an alternative ship of 30,000 gross tons.

Tin Consumption Is Expanding

UNDER the terms of the new international tin agreement, which came into force at the beginning of this year, total permitted exports of tin from the seven countries concerned should amount to 129,904 tons annually with the

quota at 65 per cent of standard, according to word from the International Tin Research and Development Council.

The standard production, with the quota at its present rate of 100 per cent, will be 199,850 tons a year, while, if the quota should reach 125 per cent, the permitted exports would be 249,814 tons annually. These figures exclude the production of Cornwall and Portugal and of countries not participating in the agreement.

A preliminary figure of 171,000 tons is given as the total world production in 1936, indicating an increase over the 1935 output of about 30,300 tons. World consumption for 1936 is estimated at 154,000 tons against 142,500 tons in 1935. Consumption in the United States increased by 13,050 tons, or nearly 22 per cent, but in the United Kingdom, the second largest tin consumer, there was a decrease of 5½ per cent.

At the end of the year world visible stocks of tin stood at 22,695 tons, representing 14.8 per cent of the present annual rate of consumption, whereas at the end of 1935 stocks were 13,841 tons, or only 9.7 per cent of the rate of consumption at that time.

American Management Association will hold its fifteenth annual personnel conference at the Benjamin Franklin Hotel, Philadelphia, on Feb. 9, 10 and 11. Discussion will largely be given over to current problems in the field of industrial labor relations.

Sees Further Trend To Special Steels

The new year will see a growing trend in the steel industry toward the production of special steels, each designed to meet certain needs, according to W. F. Detwiler, executive vice-president, Allegheny Steel Co. In many fields already, steel is not merely "steel" but an alloy evolved by research for some special application.

"Through its metallurgical and engineering work, the steel industry has made outstanding improvements but the public does not yet recognize fully the merits of the products now available," said Mr. Detwiler. "A major problem of the steel industry in the coming year, therefore, is the education of the ultimate consumer to take advantage of the increased efficiency of the new steels which can be used to improve the products he buys.

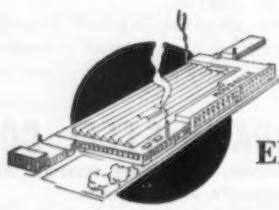
"Educating the consumer involves direct contact between the steel manufacturer and the public, and consequently a rehabilitation of steel marketing methods. Based on our own experience, it may confidently be expected that when this is accomplished, both the public and the industry will benefit.

"The steel industry is alive to the need for greater contact with its final customers and the coming year may be expected to witness a growing tendency along this line.

"Another trend which is new in 1937 is the use of stainless steel in automobiles for increasing strength and reducing weight. Large tonnages of stainless steels have been used, and are being used, for corrosion-resisting and ornamental applications to automobiles, but 1937 witnesses the production of cars with panels of light but strong stainless steel welded to the sides of the cylinder blocks to replace similar areas of heavier cast iron.

"There are numerous other possible uses for this material in automobile engines, chassis and bodies for weight saving, greater strength against deformation and bending, and complete resistance to weather without protective coatings. It is already being so used in other transportation fields, having made possible the construction of streamlined trains which are as strong as standard steel trains of the same size, but only about half as heavy. Wherever weight must be moved, as in the airplane, automobile, truck and railroad train, the trend will undoubtedly be toward the increased use of weight-saving alloys such as stainless steel."

IN most manufacturing enterprises there is a production bottleneck—a limitation of total output simply because of an inability to speed up production at a single point along the line. Perhaps Houde can break that bottleneck in your plant. We know that we are producing metal parts or complete assemblies for a hundred or more nationally known manufacturers with greater precision, more speed and at a lower cost than they could do it themselves.



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Armco Operations Cut To Aid Flood Victims

MIDDLETOWN, Ohio, Jan. 25.—Operations at the Middletown plants of American Rolling Mill Co. have been curtailed on account of the pressing need to conserve power for use in the flooded districts, according to Charles R. Hook, president of Armco. Middletown is not in the flooded district, but it is in the vicinity of Cincinnati, where the rising waters have disabled local power services. However, since Armco manufactures about 60 per cent of its own power at the Middletown Armco plant, certain departments will continue operations, it was explained. The open hearth, finishing mill, galvanizing, shipping, and other departments using domestic power will run.

The Hamilton Coke & Iron Co., Armco's Hamilton, Ohio, subsidiary, has been asked to continue its operations by Columbia Gas & Electric officials. The coke ovens of this company produce millions of feet of gas daily which are consumed in Cincinnati, Hamilton, and other nearby cities. Closing down this unit would result in a serious gas shortage in southern Ohio. For this reason arrangements have been made by the utilities company to supply the Hamilton Coke & Iron Co. with enough power to maintain operations. Though the Zanesville, Ohio, and Butler, Pa., Armco plants are unaffected by the flood, the Ashland, Ky., plant found it necessary to discontinue operations early Saturday. After highways became impassable, employees were transported through flooded lowlands by rail until rising waters stopped this method of transportation. Of course, it is not possible to make shipments from this plant, but it is expected normal operation will start in a few days.

Foundry Equipment Makers to Meet

FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION, INC., will hold its annual meeting in the Cleveland Hotel, Cleveland, Feb. 2. Various topics will be discussed, including the field of customer relations and service and methods for increasing sales without substantially increasing the ratio of sales expense. Standing committees will make their reports and new officers will be elected. C. E. Hoyt, manager of exhibits of the American Foundrymen's Association, will explain ar-

rangements and facilities for the exhibit to be held in connection with the annual A. F. A. convention in Milwaukee next May.

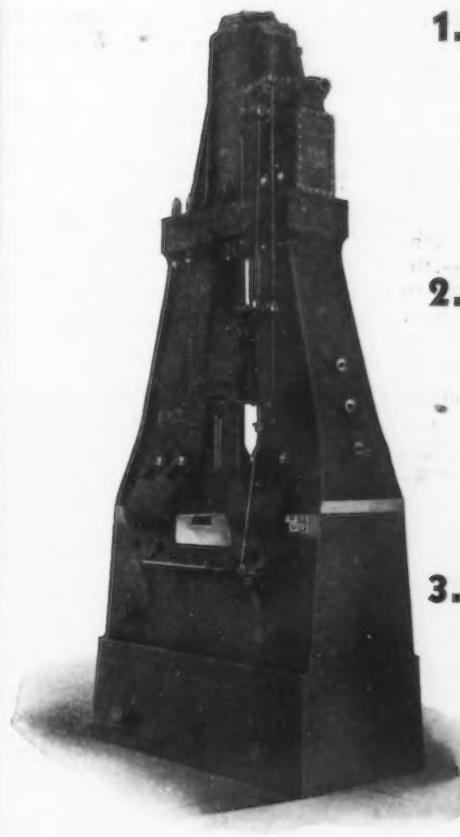
New Protective Film

A LIQUID protective film which can be applied on any article, and is said to protect the surface from being scratched during the last stages of manufacture, during packing and shipping, or while in dealer's stock and show rooms, has

been introduced by the Park Sales Co., 3 Park Place, New York. Termed "Protex 2 A," this product comes in two colors, blue and red, is transparent, and is applied with a soft brush and is said to dry in a few minutes. According to the makers, one of its principal advantages is that it can be removed very easily, no dissolvent being necessary. The surface need only to be moistened by breathing upon it, or by applying damp cloth or blotting paper, after which the protective film may be peeled off.

THIS NEW ERIE STEAM DROP HAMMER

in the crankshaft forge shop of a prominent automobile manufacturer



1. Reduced Steam Consumption

With the same ram, the cylinder bore was reduced from 27" to 23". The old hammer was 30% larger in cylinder area but the new hammer is faster, hits harder.

2. Increased Production

The new crankshaft, 14-lb. heavier than the old one, is made with three fewer blows. This is the best possible indication of the new hammer's speed and force, and of the character of its blow.

3. Runs on Lower Pressure

In spite of the smaller cylinder bore, it has been possible to cut down the steam pressure below that previously used. This is important for shops that want to operate their hammers on compressed air, or on low steam pressure.

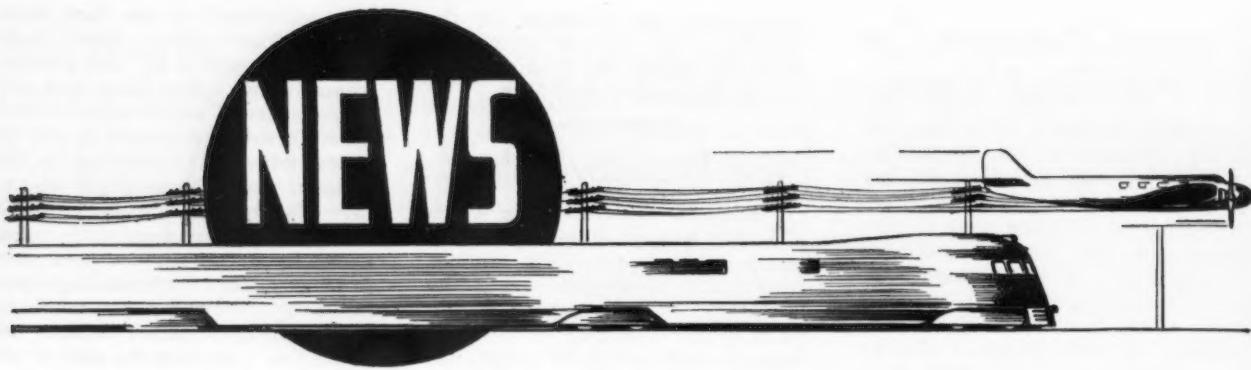
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Carnegie-Illinois Employees Start Campaign Against Lewis' CIO

PITTSBURGH, Jan. 26.—"Glass workers who recently were granted an increase of 8c. per hr. at the conclusion of their strike will have to work for five years to make up the wages they lost during the 13 weeks they were out on strike," declared William R. Hill, chairman of the Pittsburgh District General Council of Employee Representatives, of the Carnegie-Illinois Steel Corp. Hill's organization is opposing John Lewis' Committee for Industrial Organization, which is trying to sign steel workers in one of Lewis' outlaw labor unions.

"That's the big reason we steel workers favor the employee representative plan," declared Hill. "We feel confident that the plan, even with its present imperfections, is far better than anything Lewis'

Amalgamated Association of Iron, Steel and Tin Plate Workers has to offer."

Hill explained that the glass company had offered its employees a raise of 5c. per hr. last October, which the professional labor leaders of the glass workers had refused. A wage increase of 8c. gave the men a net increase of only 3c. per hr. Figured on a minimum of 55c. per hr. and a 40-hr. week, it would take 238 weeks, or almost five years, to make up the strike loss to the men.

Hill's statement came with the announcement of the formation of a finance committee which will raise funds to carry on the fight of employee representatives against the CIO. The first piece of literature issued by the employee union

has been distributed in most of the 18 plants of the corporation in the Pittsburgh district.

The folder, titled "To Our Fellow Employees of the Carnegie-Illinois Steel Corp.", points out that many wage advances and other victories for the employees have been won under the plan and that more than 70 per cent of all cases between the men and management to come up under the plan have been decided in favor of the men.

The folder says, "those of us who are on the Defense Committee of Employee Representatives are convinced without a shadow of doubt that with very little expense to us, without a closed shop and *without strikes*, we can secure with our own organization more than we can attain with Mr. Lewis' CIO. Why should we pay Mr. Lewis a lot of money for something that we can do for ourselves at little or no cost?"

With the folder was issued a small leaflet entitled "Maloy Unmasked," which informed the steel

NEWS AND MARKET INDEX

Personals	65	New York Market	83
Obituary	71	Fabricated Steel	86
Steel Ingot Production	72	Non-ferrous Market	87
Summary of the Week	73	Scrap Market and Prices	88-89
Pittsburgh Market	74	Finished Iron & Steel Prices	90-91
Comparison of Prices	75	Warehouse Steel Prices	92-93
Chicago Market	77	Pig Iron & Raw Material Prices	94
Philadelphia Market	79	Machine Tool Activity	95
Cleveland Market	81	Plant Expansion & Equipment	96

COLLET AND FEED FINGER SECTION



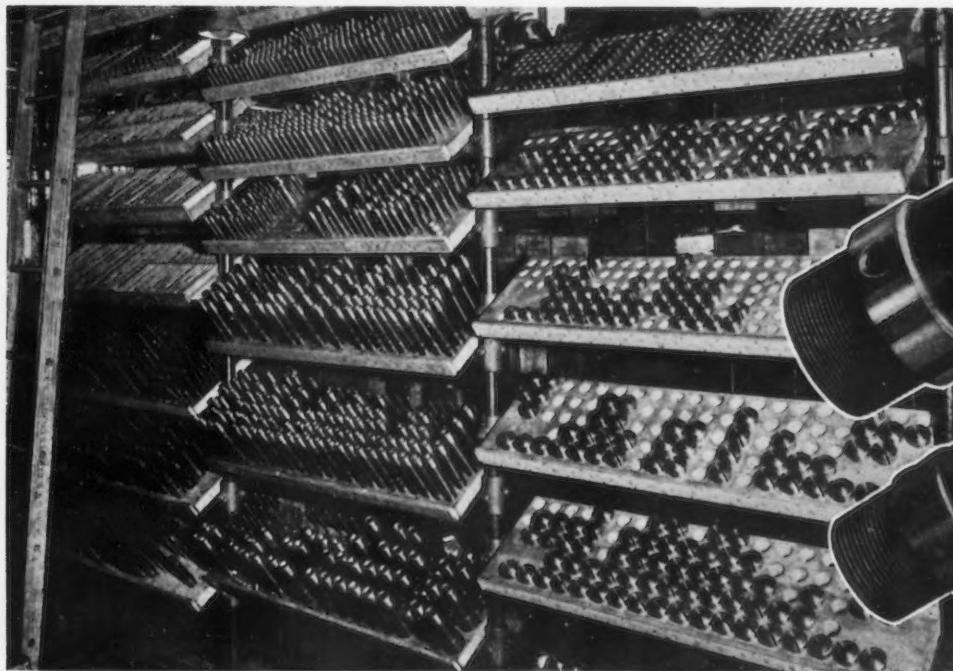
Section of one of our collet stock and shipping departments

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workers that Elmer J. Maloy, ousted chairman of the employee delegates, while on the stand in Washington before the National Labor Board on Jan. 14, 1937, testified that during all of the time he had been acting as chairman he had been a paid organizer for the steel workers' organization committee engaged in signing up members for the Amalgamated association. He also admitted having said that he would do what he could to destroy the employee representative plan.

Hill pointed out the plight of the United Mine Workers as an example of what steel workers face if they join the Amalgamated association. Both unions, he pointed out, are dominated by John L. Lewis, and he contrasted the check-off as paid by 500,000 members of the miners' union with the situation of Carnegie-Illinois steel men, who pay nothing at all for dues or assessments as members of their employee organization.

"We steel workers are convinced that under the representation plan, which has been working for over three and a half years, we are getting better results than we would under the Amalgamated association, and at no cost to us," he declared.

"John Lewis has been using an awful lot of the Mine Workers'

money trying to organize the auto and glass workers, and now he's trying to organize the steel workers. His Steel Workers Organization Committee, financed by the miners' money, has an entire floor of one of the most elaborate office buildings in Pittsburgh as its headquarters. If we're saps enough to fall for his hokum, our money will be used by Lewis and his gang to go out and try to organize some other industry, for the main purpose of providing more power and money for Mr. Lewis.

"If the miners want to be big-hearted and pay out their money for high-paid organizers, fancy offices and other foolishness, all of no value to them, let them. They earn their money with their hands and their backs and a lot of sweat. They should know its value, and if they want to throw it away, that's their affair.

"But we steel workers refuse to be sheep. We work hard for our money, too, and we aren't going to shell out our dough every time John Lewis pounds the big drum."

Pittsburgh Glass Strike Settled

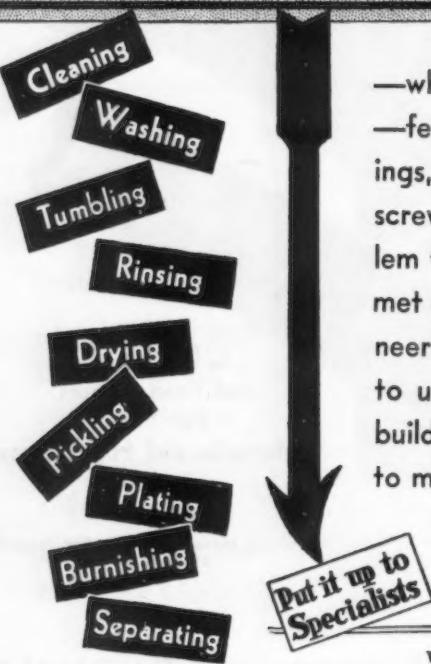
PITTSBURGH, Jan. 26—Ending a three-months strike last week, 7000 employees of the Pittsburgh Plate Glass Co. returned to work under a one-year contract which provides for a flat increase of 8c. per hr. for all workers, a minimum rate of 63c. per hr. for men workers and a minimum rate of 55c. per hr. for women. Included also in the new contract was recognition of seniority rights and the creation of a commission to investigate pay differences between the Pittsburgh

Plate Glass Co. and the Libbey-Owens-Ford Co. The check-off system and the closed shop, stumbling blocks in the numerous meetings between union and company officials, were not granted, representing a partial victory for the glass company, which has consistently maintained that it would refuse to concede these two points. The union claims a 90 per cent membership of all workers in the company and gave this as their reason for withdrawing the check-off and closed shop demand.

All hourly rates and the two minimum rates for men and women are the highest in the company's history and it is understood the new pay schedules are the same for all the company's plants regardless of the geographical location.

As all the Pittsburgh company plants shut down simultaneously, resumption of operations will find a large amount of safety glass in the various processing stages. While it will take from three to four weeks before the furnaces will be in a position to furnish molten glass, some of the finished product will be shipped soon, owing to the fact that a large amount of stock was in various stages of production. Most observers feel that a swift settlement of the Libbey-Owens-Ford strike is in prospect. It is estimated that the Pittsburgh Plate Glass Co. and the Libbey-Owens-Ford Co. supply more than 80 per cent of the safety glass used in the automotive industry.

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Rust Furnace Co., Pittsburgh, has been awarded a contract for 20 chambers of box annealing furnaces by the Republic Steel Corp. for use at the new Cleveland continuous mill. The Rust company also received an order for a large stress relieving furnace from the Chicago Bridge & Iron Co. for its Birmingham plant.

Press Comment on the Motor Strike

Company Is Right

If John Lewis's union does not represent a majority the company would be violating the spirit, if not the letter, of the Wagner act if it recognized the union exclusively, because the law says:—"Representatives designated . . . by the majority of the employees . . . shall be the exclusive representatives of all employees." The company by now raising the question of majority would be putting itself in the right, both legally and in popular opinion, and there are strong indications that this is exactly what it is now preparing to do.—By Hugh S. Johnson in *New York World Telegram*.

National Assembly Line

In Sanford, Maine, a small town with a census population of 13,492, the principal industry is the Sanford Mills. Normally employing about 3000 workers, the business plays a vital role, direct or indirect, in the lives of most of the town's inhabitants.

A few days ago, the company shut down one-half of its looms. Fifteen hundred men, probably about one fourth the town's employed population, were thrown out of work. Effects on the buying power of the community are obvious.

The reason? The men were engaged in weaving automobile upholstery materials. Strikes in Cleveland and Flint had reached their long arm away up into the state of Maine. Sanford, one of many "innocent bystanders," has felt the full force of the struggle in which it does not participate directly and which it is helpless to settle.—*Wall Street Journal*.

Strikers a Minority

Although union officials stamp all stories about "loyal" workers as company propaganda, observations by this reporter in Flint, Pontiac, Detroit and Lansing lead to a conclusion that only a small minority of the employees now out of work are really on strike; the overwhelming majority, being thrown out of employment by lack of materials to work on, would like to get back on the job.

In Flint, where, out of a population of 160,000, there are 46,000 General Motors employees, including 42,000 hourly wage workers, with 80 per cent of the families in the city directly dependent on the company payroll, the company and local newspaper men estimate that not many more than 1000 are ac-

tually striking, although some 30,000 are out of work because of the enforced shutdowns.

This may be an underestimate, but an objective view, considering the number of stay-in strikers and the size of the union street demonstrations, would indicate that the number of strikers here probably could not be much more than 2000.—Excerpt from Flint dispatch to *New York Times* from Russell B. Porter, special staff correspondent.

Lewis On Defensive

Evidence is accumulating, indeed, which indicates that the CIO organizers have made to little allowance for the resentment of excluded workers who have no quarrel with their employers. Mr. Lewis' intemperate attacks upon the A. F. of L. craft unions, accused of "scabbing" in ordering their members to return to work, strongly suggests that he is on the defensive and trying to conceal weakness by noisy bluster. It begins to look as if he made a fatal mistake in assuming that the automobile industry could be catapulted into nation-wide organization along industrial lines.

The sit-down strikes are patently an illegal occupation of property. They set a dangerous precedent which if tolerated on an extensive scale would soon break down our existing social and economic order.

For that reason, it is easy to understand why the General Motors management has insisted that evacuation of their factories must precede collective bargaining. Now that the inherent weakness of this high-handed method of procedure is being disclosed, with a mounting flood of protests from those forced out of employment, the danger from a spread of sit-down strikes seems much less serious.—*Washington Post*.

Country "Bulldozed"

Under Mr. Roosevelt, after four years of uplift and striving toward the more abundant life and the spending of a debatable number of billions, the government now negotiates with men who defy the authority of government, and the country is timidly patient if not thoroughly bulldozed.—By Westbrook Pegler, *New York World-Telegram*.

The Lewis Blunder

Almost universal is the expression of belief by the American press that Mr. John Lewis has committed a blunder worse than a crime. The effrontery with which he presented at the White House his bill for services rendered, and demanded payment on account, went far to destroy his reputation as a supreme labor tactician. President Roosevelt's refusal to acknowledge any political obligation to him left Mr. Lewis looking like a leader already discredited. His appeal for aid to the President was a tacit confession that by himself

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he was not able to carry out the policy upon which he had embarked. This failure should strengthen the reported determination of General Motors to open their plants as rapidly as possible, and to take steps to recover control of their own property. Such a plan would apparently now have a popular support almost as complete as that given to the President for his open rebuff to Mr. Lewis.—New York Times.

Few Wage Scales As High As Automotive

John L. Lewis, who is back of the threatened oil and automobile strikes, in all his years as head of the United Mine Workers has never been able to obtain for members of his union wages as high as those voluntarily paid to oil and automobile workers. There are few union wage scales as high as the wages paid by the oil and automobile industries.

With the automobile and oil industries voluntarily granting wage increases and setting the pace in re-employment, workers should ponder the question whether now is the time for them to strike in order to force recognition of their particular unions. They should ask themselves whether John L. Lewis and his organizers could obtain more for them through union pressure than will come to them normally if nothing is done to halt the present trend toward recovery.—Tulsa Tribune.

Mesta Machine Co. At Full Capacity

MESTA MACHINE CO., Pittsburgh, manufacturer of steel rolling mill equipment, announces that unfilled orders at the end of 1936 totaled approximately \$18,000,000 compared with less than \$10,000,000 at the close of the previous year, and about \$10,500,000 last July.

As a result, the Mesta plant is working at full capacity, three shifts a day and seven days a week. Since last March, the company has completed an expansion program which has increased its manufacturing capacity about 20 per cent.

Iron Mining Wages Total \$14,623,599

IRON mines and beneficiating plants in the United States in 1935 employed 14,873 wage earners and paid wages totaling \$14,623,599, an average of \$983 per wage earner, according to an announcement of the Department of Commerce.

The number of wage earners was obtained by averaging the total reported on payrolls on the 15th of each month. This procedure gave a somewhat lower figure than the total number actually engaged in

the production of iron ore during the year; for more than 16,000 were employed in the peak months. Salaried officers, technical and supervisory employees, and others working on a salary basis in iron mining in 1935 totaled 1367 with salaries amounting to \$3,020,285. Expenditures for supplies and materials, fuel, and purchased electric power amounted to \$10,871,646. Supplies and materials comprised 61 per cent of the total; fuel, 15 per cent; and purchased electric power, 24 per cent. The value of iron ore produced in 1935 was \$76,733,841, which included \$12,413 derived from work or services as well as manganese-bearing ore valued at \$1,165,643. Ores containing up to 35 per cent manganese are included in the 1935 figures to maintain comparability with the Census of Mines and Quarries canvass for 1929.

Wisconsin Considers New Labor Law

A BILL proposing creation of a State Labor Relations Board has been presented to the Wisconsin Legislature. This labor disputes bill endorsed by Gov. Philip F. LaFollette, has been prepared by officials of the State Federation of Labor, who were assisted by Dean Lloyd K. Garrison, University of Wisconsin Law School, and former chairman of the National Labor Relations Board.

A similar bill was defeated in the 1935 Legislature. This new bill, modeled after the Wagner law, will place in the hands of organized labor a powerful weapon, and from all indications will strike a blow at the company union. A provision in the bill empowers the majority of workers in any unit to become the exclusive bargaining representatives for the entire unit. The administering and enforcing agency will be a labor relations board of three members, each to serve four-year terms at an annual salary of \$5,000.

After seven months of inactivity, following a disastrous fire last June, the Defiance Pressed Steel Co. resumed operations this month in a new plant at Marion, Ohio. Formerly situated in Defiance, Ohio, the old plant was ruined and a new plant site was sought. The buildings formerly occupied by the Power Mfg. Co., Marion, were taken over, renovated and rehabilitated. In business 66 years, the company specializes in metal stampings of all kinds and welded assemblies.

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cause down time for tool dressing is substantially reduced, *resulting in more pieces per tool grind*. With Sunoco, cutting speeds can be stepped-up and consistently better finish and greater accuracy maintained.

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Armco Workers Elect New Representatives

In the annual election of employee representatives of the American Rolling Mill Co., 97 per cent of the employees eligible to vote participated in the polling, according to a statement from the company following a tabulation of the results.

Held in accordance with the employee representation plan that has been in effect in Armco plants for 33 years, the employees of each department elected their representatives who in turn selected an executive committee to represent the workers in their relations with the management. The company pointed out that in the last third of a century there has been no loss of either production or wages due to labor troubles.

Estimate of Social Security Income

ESTIMATES of the National Industrial Conference Board indicate that had the Social Security Act been in effect in 1929, \$1,019,000,000 would have been collected, while the collections would have declined in 1933 to \$493,000,000 and in 1935 would have amounted to \$629,000,000.

These amounts represent 3 per cent of the estimated salaries and

wages paid in those types of employment included in the Federal unemployment compensation plan, and by employers having eight or more employees. In 1929 such salaries and wages amounted to \$33,976,000,000 in 1933 to \$16,460,000,000, and in 1935 to \$20,972,000,000.

E. G. Grace Lauds Employees' Plan

COMPETITIVE enterprise is the keynote for success in the steel business, according to E. G. Grace, president of Bethlehem Steel Co., in his foreword appearing in the current issue of the Bethlehem Review, which is being distributed to Bethlehem employees.

"The success of our company in the long run depends upon its ability to meet competition and to forge ahead in every department of its efforts," says Mr. Grace. This issue of the periodical is given over to features and pictures of high-spot Bethlehem accomplishments during the year.

Among the things not hitherto brought to public notice is the fact of an addition to the tool steel facilities at the Bethlehem plant, which will include a furnace to pre-heat ingots prior to hammer cogging, cut-off machines and new polishing equipment. Another item not hitherto announced by the company except in special trade advertising is its development of a new

type of pipe for refrigerating service, called Ammonoduct. This product has been developed to meet the growing demands of the refrigerating and air-conditioning industries.

"The past year has been one of encouragement for employees and for the company," says the letter of Mr. Grace in appraising the general situation. "The wage rate schedule has been put at a new high level. This was done ahead of dividends to our common stockholders and ahead of price advances.

"The relationships between management and employees have continued with the same mutual regard and understanding which have existed for many years. The employees' representation plan never more fully performed its function as an effective means of collective bargaining. In addition to wage increases, other noteworthy achievements in bettering working conditions were accomplished, among which were the new vacation plan and payment for overtime work.

"For nearly 20 years the representation plan has served the interests of employees. What it has accomplished is reflected in the greatly improved wages and working conditions that exist today. Based as it is on confidence and cooperation it promotes industrial peace. Industrial peace, not strife, is what we need. Those who would best serve the interests of labor will protect the plan. They will protect it for what it is—a fair, square, effective and responsible method of collective bargaining."

Lecture Course In Grinding

NORTON CO., of Worcester, has issued an 80-page booklet comprising a series of 10 lectures on the theory and practice of grinding. This has been prepared primarily for educational institutions and covers general information on the history and development of grinding, natural abrasives, manufacture of artificial abrasives, manufacture of grinding wheels, the characteristics of grinding wheels, their selection and care, fundamental principles used in practice and practical methods employed in grinding.

This material is not intended to be an exhaustive study of the subject, but contains fundamentals that a student should know.

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..PERSONALS..

F. A. KELLY, manager culvert division, Republic Steel Corp., has been appointed building products coordinator and attached to the general sales department. This new position was created because of Republic's activities in the building field through its subsidiaries, the Truscon Steel Co., Berger Mfg.



F. A. KELLY

Co., and Steel & Tubes, Inc. The Berger company's resumption as a producer of building materials was recently announced. Mr. Kelly has been associated with Republic since 1931, when he became vice-president and general manager of the Canton Culvert Co., then a subsidiary. A native of Akron, he spent several years in newspaper work and in 1927 joined Electric Research Products, Inc., the sound division of Western Electric Co. After two years with this organization he became vice-president of Enterprise Aluminum Co., Massillon, Ohio, in 1929, with which he remained until he joined the Republic organization.

♦ ♦ ♦

RALPH S. JENKINS has been appointed vice-president in charge of manufacturing of all divisions of Gar Wood Industries, Inc., Detroit. Mr. Jenkins came from Minneapolis, where he resigned as general manager of the St. Paul Hydraulic Hoist Co. to become associated with Gar Wood Industries, Inc. In 1921, Mr. Jenkins became affiliated with the Wood Hydraulic Hoist & Body Co., Gar

Wood Industries' name at that time, when Gar Wood purchased the Horizontal Hoist Co. in Milwaukee. Starting as an assembly foreman, Mr. Jenkins became general inspector, assistant factory superintendent, and finally director of all the company's branches, a position which he held until 1932, when he left Gar Wood to become general manager of the St. Paul Hydraulic Hoist Co.

♦ ♦ ♦

LESLIE L. ANDRUS, assistant sales manager of the American Foundry Equipment Co., Mishawaka, Ind., for the past two years, has been appointed general sales manager in charge of sales, service and advertising. He received his technical training at Purdue University, from which he was graduated in 1924.

♦ ♦ ♦

JOHN H. RODGER, who has been identified with the Oxweld Railroad Service Co., Chicago, since 1928, first as vice-president and later as executive vice-president, has been elected president. Prior to his connection with the Oxweld company, he was for 17 years with

the Safety Car Heating & Lighting Co. in various capacities, completing his service as vice-president in New York.

♦ ♦ ♦

T. D. MONTGOMERY has been appointed manager of the foreign sales division of Cutler-Hammer, Inc., Milwaukee. He has had wide experience in the application of the company's products, general company policies and methods of distribution.

♦ ♦ ♦

M. D. CONROY, heretofore assistant to the general manager of the Granite City Steel Co., Granite City, Ill., has been made assistant to G. HAYWARD NIEDRINGHAUS, president of the company. PHILIP J. STREMMLER, who has been general superintendent, has been made vice-president in charge of operations. JOHN H. VOHR has been promoted from superintendent in charge of strip mills to general superintendent of plants, B. B. JOHNSTON from assistant to general superintendent to assistant general superintendent, and N. B. RANDOLPH, from assistant general manager of sales to general manager of sales, working under



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LAURENCE MILLER, vice-president in charge of sales.

Mr. Conroy received his formal education in the schools of Youngstown and went to St. Louis in 1903 to become identified with the Helmacher Forge & Rolling Mills Co. A few years later, he was made general superintendent of the St. Louis and Madison, Ill., plants of that company. When these were acquired by the American Car & Foundry Co., he was made general superintendent of the company's plant at Madison, severing his connection in 1930. He became identified with the Granite City company in 1932.

Mr. Stremmel has been associated with the company and its predecessor since 1893 successively as tin mill roller, night and day superintendent of the sheet and tin mills. In 1918 he was made assistant general superintendent and general superintendent in 1928.

Mr. Vohr has been superintendent of the hot and cold strip mills since last January. Following graduation from Cornell University in mechanical and electrical engineering, he was associated with the New York State Railways as an electrical engineer. After serving in the War, he joined the American Sheet & Tin Plate Co. at Farrell, Pa., and later was transferred as assistant superintendent of strip mills to the company's plant at Gary. Since leaving the company in 1931, he has been associated with the installation and operation of the wide

strip mills of the Inland Steel Co. and Youngstown Sheet & Tube Co.

Mr. Johnston has been identified with the company for many years, as assorter in the finishing department and foreman of the finishing and other departments until 1930, when he was made assistant to Mr. Stremmel.

♦ ♦ ♦
H. G. DALTON, senior partner of Pickands, Mather & Co., Cleveland, and chairman of the board of the



HENRY G. DALTON

Youngstown Sheet & Tube Co., has been elected vice-president of the 1937 Great Lakes Exposition in Cleveland. Included on the executive committee of industrial and

business leaders heading this year's exposition are T. M. GIRDLER, chairman and president, Republic Steel Corp.; ELTON HOYT, II, partner of Pickands, Mather & Co.; G. M. HUMPHREY, M. A. Hanna Co., and C. F. BLACKMER, president, American Steel & Wire Co.

♦ ♦ ♦

D. P. ARMBRUSTER has been appointed furnace engineer, Gas Machinery Co., Cleveland, succeeding T. F. SCHILLING, who recently resigned.

♦ ♦ ♦

ERWIN A. WENDELL has been made district sales manager at St. Louis by Link-Belt Co. He has been connected with the Link-Belt Pershing Road plant in Chicago since 1918, and for a number of years had served as sales engineer in metropolitan Chicago. He succeeds HOWARD L. CURDON, who has been transferred to the company's Chicago plant to assume sales responsibilities in the Chicago territory.

♦ ♦ ♦

CHESTER H. LEHMAN, vice-president, Blaw-Knox Co., was reelected a director of the Highway Industries Bureau at the annual meeting held in conjunction with the American Road Builders Association, at New Orleans, Jan. 13.

♦ ♦ ♦

SAMUEL L. SHOBER, JR., former resident manager of the Philadelphia office of Hickman, Williams & Co., Philadelphia, has been appointed Eastern manager. JOHN M. ROBB, JR., succeeds him as resident manager, and NORMAN E. CRAIG continues as resident manager in the New York office.

♦ ♦ ♦

CONRAD L. OTT, for the past 10 years research and executive engineer for the Landis Tool Co., Waynesboro, Pa., has resigned to join his father's company, the Ott Machinery Sales, Inc., Detroit, dealer in used and rebuilt metal-working machinery.

♦ ♦ ♦

RICHARD F. BARNES, JR., who has been employed during the past three years on research and production work in the manufacture of organic plastics, has been added to the staff of the International Nickel Co., New York. He is a graduate of Massachusetts Institute of Technology. CARL ROLLE, a graduate of Pennsylvania State College and holder of a Master's degree from Massachusetts Institute of Technology, has also been added to the staff.

♦ ♦ ♦

CLEMENT THELANDER, industrial stylist, whose studios have been

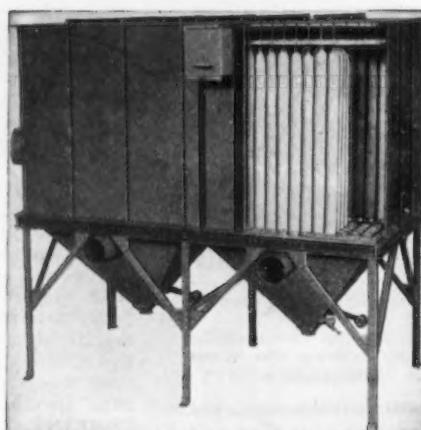
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If you are thrifit-minded, you will welcome the lower machining and assembly costs that go with the use of B & L Standard Commercial Flats.

Cold drawing brings them to accurate section and smooth finish. True flat surfaces and square sharp corners—adherence to standard manufacturing tolerances and insurance of excellent physical properties—all these are practical advantages that help you build precision and quality into your products.

To overlook possible uses of these handy sections, is to pass up obvious economies in your fabricating operations. Check up on machine mountings, bed plates, backing for dies, jigs and fixtures—they are just a few of many opportunities for "flat" applications.

Available in a range of sizes for every requirement — from $1/8$ " x $3/16$ " to 3 " x 6 "—and Extra Wide Flats from 6 " to 12 " and $1/4$ " to 2 " thickness. B & L stocks carried in local warehouses from Coast to Coast.

COLD DRAWN STEEL

• GROUND SHAFTING

• ULTRA-CUT STEEL

• SPECIAL SECTIONS

• ALLOY STEELS

BLISS & LAUGHLIN, INC.

HARVEY, ILL.

Sales Offices in all Principal Cities

BUFFALO, N.Y.

situated in Rockford, Ill., has moved to 646 North Michigan Avenue, Chicago.

♦ ♦ ♦

R. P. M. CARMODY, who has been identified with the Cleveland office of the Clark Controller Co., has been placed in charge of the Buffalo district office, effective Feb. 1, succeeding W. S. GAIN, who has resigned.

♦ ♦ ♦

G. A. RUEHMLING, formerly manager of sales and engineering of the General Plate Co., Attleboro, Mass., has become identified with the Schrumm Process Co., Providence, builder of controlled atmosphere furnaces.

♦ ♦ ♦

ROBERT J. TULLY, assistant general superintendent of the Clairton steel works and coke by-products plant, Carnegie-Illinois Steel Corp., has been appointed assistant general superintendent for the Youngstown, Ohio, district in charge of industrial relations. He will have charge of employment, safety and welfare at the MacDonald, Upper and Lower Ohio Mills where L. N. MACDONALD is general superintendent. Mr. Tully has been continuously employed by subsidiaries of United States Steel Corp. since 1895, when he became machinist apprentice of the American Steel & Wire Co. plant at New Castle, Pa. He became a job foreman of the Carnegie Steel Co. at New Castle in 1906 and later assistant master mechanic and master mechanic for a number of years at the same plant. From 1926 to

1932 he was general superintendent. He was master mechanic of the Clairton works in 1932 and after six months in that capacity became assistant general superintendent.

Personal Changes in Steel & Wire

C. F. HOOD, who has been vice-president in charge of operations of American Steel & Wire Co., Cleveland, has been appointed executive vice-president, a newly-created office. M. W. REED,



C. F. HOOD

who has been Mr. Hood's assistant and chief engineer, has been named vice-president in charge of operations succeeding Mr. Hood. H. B. JORDAN, who has been manager of

the Cleveland district mills, has been named assistant to the vice-president. G. H. ROSE, formerly construction engineer, has been appointed chief engineer. B. H. GEDGE, who has been superintendent of the Cuyahoga works, succeeds Mr. Jordan as manager of the Cleveland district mills and is succeeded by W. F. MUNFORD, who has been assistant superintendent of the Cuyahoga works. The changes become effective immediately.

Unemployment Up Slightly in November

UNEMPLOYED workers in November, 1936, numbered 8,968,000, according to estimates of the National Industrial Conference Board. This figure represents an increase of 198,000, or 2.3 per cent over the October estimate, and a decrease of 1,786,000 or 16.6 per cent from November, 1935.

Employment in all types of enterprise in the United States in November, 1936, was 43,855,000, a decrease of 148,000 or 0.3 per cent as compared with October and an increase of 2,392,000 or 5.8 per cent over November, 1935.

The number of workers employed in November, 1936, was 7 per cent below the average monthly employment figures for 1929.

From October to November, 1936, employment increased in manufacturing, trade, distribution and finance, and mining; while decreases were found in construction, agriculture, service, transportation, forestry and fishing, and public utilities.

Compared with November, 1935, employment a year later had increased 8 per cent in manufacturing, 27.9 per cent in construction, 8.9 per cent in transportation, 4.7 per cent in trade, distribution and finance, 3.6 per cent in the service industries, and 2.1 per cent in agriculture.

Otis Steel Co. to Widen Strip Mill

O TIS STEEL CO., Cleveland, plans extensive changes and additions to its Riverside works, Cleveland, largely to permit the rolling of wider material than at present. Plans provide for widening the continuous hot mill and cold mill from 72 to 77 in., the installation of a new four-high 77-in. sheet mill, reconstructing and enlarging two soaking pits and the addition of gas producers. A bond issue of \$15,000,000 is being floated.

NO PAK VALVES

An air leak equal to $\frac{1}{16}$ " diameter hole costs \$28.00 per month. Air is expensive, control it efficiently and accurately with a NOPAK valve—a patented leak-proof valve guaranteed to stay tight without maintenance. Its flat, patented disc together with a packless spindle prevents sticking and assures you of many years of leak-proof operation. Permits throttling or quick opening. Easy to operate. Seat protected at all times and cannot wear out. NOPAK valves are suitable for air, gas, water, or oil. Write for Bulletins.

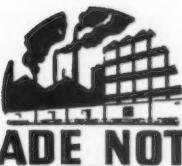


Made in shut-off, three-way and four-way styles $\frac{1}{4}$ " to 2" pipe openings, three and four-way for operating single and double acting cylinders.

GALLAND-HENNING
MANUFACTURING COMPANY

2724 S. 31st Street Milwaukee, Wisconsin

ALSO COMPLETE LINE OF BALERS: Electric and Hydraulic, also HYDRAULIC PRESSES and PUMPS



.TRADE NOTES.

Worthington Pump & Machinery Corp. absorbed its subsidiary, Carbondale Machine Corp., as of Jan. 1. Carbondale organization, products, and sales activities, will be continued as a division of Worthington.

Lincoln Electric Co., Cleveland, has opened a Chattanooga, Tenn., office at 1015 Hanover Street. Robert Daniels, who has been associated with the company in sales work since April, 1934, will be in charge.

Sterling Strip Steel Corp. is now located at 90 to 92 West Street, New York.

Swartz & White Mfg. Co., Binghamton, N. Y., has moved to 215 Washington Street.

Crane Packing Co., Chicago, has moved its Houston, Tex., office to 1303 Capitol Street, where a new factory branch and warehouse has been established.

National Machinery Exchange, formerly of Brooklyn, has moved to 128 to 138 Mott Street, New York.

Poor & Co., Vermilion Malleable Iron Works, Hooperston, Ill., will henceforth be known as Vermilion Malleable Iron Works of Poor & Co. No change has been made in management or personnel.

Ajax Flexible Coupling Co., Westfield, N. Y., announces opening of a new sales office in Louisville, Ky., with Alfred Halliday in charge. Headquarters are in the Starks Building.

Compressed Industrial Gases, Inc., Chicago, heretofore a holding company, has become an operating company, and its nine former subsidiary companies will operate in the future under the name of Compressed Industrial Gases, Inc. This organization engages in the manufacture and distribution of oxygen, hydrogen and acetylene gases, as well as all types of gas and electric welding equipment and supplies.

Bunting Brass & Bronze Co., Toledo, announces opening of new branch sales offices and warehouse facilities at 296 Ivy Street, N. E., Atlanta.

National-Standard Co., Niles, Mich., has purchased the physical assets of the Athenia Steel Co., Clifton, N. J., and will operate this plant as the Athenia Steel Division of the National-Standard Co. The organization of the purchased company will be kept intact and matters handled the same as in the past.

Foot Brothers Gear & Machine Corp., Chicago, has appointed H. F. Edge & Co., 987 Cox Avenue, Atlanta, as district representative in the Southeastern territory.

Aluminum Co. of America has on order more than 15,000 aluminum beer barrels for the Blatz Brewing Co. and the Joseph Schlitz Brewing Co. These are in addition to the large quantities of barrels purchased by these two breweries during the past few years.

Alloy Charging Boxes Cut Down Breakage

ACCORDING to Union Steel Casting Co., Pittsburgh, a subsidiary of Blaw-Knox Co., a solution to the problem of breakage of steel charging boxes has been found in the use of a special design of head and a box made of alloy steel.

One steel company which had trouble with breakage of boxes in charging heavy grades of scrap ordered a trial lot from the Union Steel Casting Co. These boxes, provided with special heads, were made from the company's "Univan," a trade name for a nickel-

vanadium composition which has been used for many years in the manufacture of locomotive main frames and crossheads, rolling mill pinions and other heavy duty applications.

According to the company, successful use of the boxes resulted in additional purchases totaling 200 boxes. In 15 months of use, none of the alloy steel boxes cracked, while some carbon steel boxes bought at the same time failed in service, the company's figures disclosed.



New
13 oz.

WELDIT

MODEL W

WELDING

TORCH

with BUILT-IN
Automatic
GAS SAVER



SAVES fuel—reduces welding cost—eliminates idle flame hazards. As operator grasps handle of torch placing thumb on lever in natural position, full welding flame is instantly on. Release thumb, and automatically flame is reduced to pilot size. No re-lighting or readjusting flame between welds. Weighs only 13 ounces, no mechanism in handle, fuel control valves are conveniently located in front of torch handle. Actual savings will soon pay for torch.

Literature on request.

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Test this
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TORCH
★ Free ★
FOR TWO WEEKS
IN YOUR PLANT

President Roosevelt Rebukes Alfred P. Sloan for Refusing Conference Bid

WASHINGTON, Jan. 26.—President Roosevelt today rebuked Alfred P. Sloan, Jr., president of General Motors Corp. for declining an invitation of Secretary of Labor Perkins to attend a conference Wednesday to resume negotiations looking to settlement of the General Motors Strike.

As if counterbalancing the rebuke which was indirectly administered by the President last week to John L. Lewis, when the latter urged intervention in the strike, the President authorized the following statement in referring to conferences he held this afternoon with labor and business groups:

"I told them that I was not only disappointed in the refusal of Mr. Sloan to come down here but I regarded it as a very unfortunate decision on his part."

Earlier in the day Miss Perkins at a press conference made a long statement in the course of which she said that she considered the action of Mr. Sloan as "defiance of the government." When the President was told that Mr. Sloan had said last week at a conference with the press that he would return to Washington if asked to do so by the President, President Roosevelt said he had been invited by his representative. He was referring to the invitation by Miss Perkins to Mr. Sloan and union officials.

The President did not indicate what further steps would be taken regarding the General Motors strike situation. Miss Perkins, however, laid before him a memorandum which is reported to have proposed legislation giving the Department of Labor power of subpoena in emergency labor situations.

The topic discussed by the President with groups of labor and business leaders, it was stated, related to labor legislation. It was admitted, however, that there was some talk of the effect of the proposed legislation on the General Motors strike. This was believed to refer to the possibility of subpoena power for the Department of Labor.

The conferences, the President said, related to legislation barring child labor and fixing of minimum wages and maximum hours of work. Miss Perkins, participating in the conferences, said the General Motors strike was discussed only briefly. William Green, president

of the American Federation of Labor, said that at the group conference in which he took part discussion was given over to legislation fixing minimum wages and maximum hours and to the Walsh-Healey government contracts act.

Secretary Perkins Silent

Secretary of Labor Frances Perkins was silent today regarding the declination by President Alfred P. Sloan, Jr., of the General Motors Corp., of her invitation to a conference in Washington tomorrow to resume negotiations looking to settlement of the General Motors strike.

Should the situation finally be taken up by the White House, apparently it would not concern such intervention as Lewis has demanded by the President, since the Chief Executive indirectly rebuked Lewis for the suggestion because it implied that the White House, rather than take a neutral stand, should

support the demands of the Committee for Industrial Organization and its affiliate, the United Automobile Workers.

The union leaders have insisted on continued occupation by sit-down strikers of the General Motors and Fisher Body plants in Flint, Mich. It was by reason of this stand that efforts to negotiate a settlement of the strike broke down. This continues to be the chief barrier blocking negotiations as indicated by President Sloan's refusal to attend the conference Miss Perkins proposed. Though she invoked a provision setting up the Department of Labor, it is contended that it does not apply to the situation and therefore is not compulsory.

Lewis, himself, is represented as not being favorable to the conference because of the fear that union officials would be asked to renew the Lansing, Mich., agreement, which required the withdrawal of sit-down strikers from General Motors plants. Refusal of President Homer Martin of the UAW to recall them broke up the Lansing conference before Governor Frank M. Murphy of Michigan had it well under way.

Walsh-Healey Impasse Worries Navy Officials

WASHINGTON, Jan. 26.—The difficulty of getting steel under the Walsh-Healey Government Contracts Act was discussed today at a conference called at the request of Navy officials, who asked that some solution be found to ease the situation. In charge of G. D. Reilly, acting Administrator of Public Contracts, the conference was attended by representatives of ten steel companies and Navy officials. It was announced that no conclusions had been reached.

The meeting grew out of refusal of steel makers to bid under the terms of the law because of its complications, including increased costs, resulting from rigid requirements as to the 44-hr. week, and involved accounting systems that must be observed. Steel manufacture being a continuous process, the problem has been especially difficult for the industry, a point which is said to have been emphasized at the conference. Alternative regulations were suggested and will be given consideration by the Government Contracts Board, it was stated.

The immediate difficulty faced

by the Navy Department is the purchase of 12,500 tons of plates, sheets, strips, and angles. Makers have declined to bid on this material which is urgently needed by the Navy in connection with its shipbuilding program. Also it is stated that some of the Navy yards have almost exhausted their stocks of steel.

Meanwhile, the Chamber of Commerce of the United States in a report made public today advocated prompt repeal of the Walsh-Healey act and the restoration of unrestricted bidding on Government contracts. The report will be considered at the forthcoming annual meeting of the chamber.

An up-to-date revised copy of the *Manufacturers' Standard Practice* has just been issued by the Association of American Steel Manufacturers, 616 Investment Building, Pittsburgh. Included are standard permissible variations in gage weight, gage thickness, size, camber and flatness of sheets. Also contained are standard classifications by size of flat-rolled carbon steel products, bars, plates, hot-rolled strip, hot-rolled and hot-rolled annealed sheets, cold-rolled strip and cold-rolled sheets.

Bethlehem Opens New York Plant

BETHLEHEM STEEL CO. has announced the opening of a reinforcing bar fabricating shop and warehouse to serve the metropolitan area of New York. Particular attention will be given to small lots requiring immediate shipment. The warehouse will carry a complete stock of reinforcing bars with the necessary machinery for fabricating work. The plant is prepared to handle requirements of any size; and trucking facilities will be available to render prompt and efficient service. The warehouse is situated at Front and Marshall Streets, Elizabeth, N. J.

Bliss & Laughlin to Build Plant Addition

C. O. KALMAN, chairman of the board of directors of Bliss & Laughlin, has announced that a \$125,000 addition will be built to the Buffalo plant. It is "urgently needed to take care of increased business," according to a recent statement. The present plant has a capacity of about 80,400 tons of cold drawn bar annually, and was built in 1928 at a cost of \$1,000,000.

No Tax Reduction In Prospect

THAT there is but little likelihood of any substantial reduction in the tax burden of the American taxpayer in the next few years was the declaration of Chairman Robert L. Doughton, of the House Ways and Means Committee, before the Council of State Governments in Washington last Saturday.

Coming from the head of the committee which originates all Federal taxation, the assertion of Representative Doughton put at rest any expectancy that may have existed that the administration would attempt any downward revision of taxes at the present session of Congress. While that was already the commonly accepted view, there was nevertheless a minority opinion that something might be done at this session to make moderate slashes in taxes. Statements of administration supporters during the political campaign had given some color to this view.

"The public debt of each of our levels of Government is high and

more and more is being demanded each year in expanding Government functions," said Representative Doughton, a statement which affords partial explanation why tax reduction definitely is not an early prospect.

The council was set up to attack the problem of conflicting taxation between states and the Federal Government and to determine the functions which can best be performed by the various levels of Government.

Mr. Doughton said that there is a possibility that a program based upon a combination of proposals to solve the problems will accomplish a settlement. These proposals, he said, are that the tax field be divided between the Federal and State Governments; that the Federal government allow a credit for state taxes paid and that the Federal Government collect the tax and allocate a proportion of it to the states.

"The inequitable distribution of the tax load is a matter of considerable resentment to the taxpayer," Representative Doughton said. "The financial burden alone is not the sole cause of his resentment. The waste of time and money involved in filing the necessary multiple returns, the keeping of proper accounts and data, and the annoyance of irksome detail

and multiplicity of incidents are also a source of ill feeling."



...OBITUARY...

JOHN MILNER, secretary of the combined Llewellyn Iron Works and Consolidated Steel Corp., died Jan. 19, of a heart attack at his home in Los Angeles.

❖ ❖ ❖

ARCHIBALD WRAY, director of J. G. Wray & Co., consulting engineers, Chicago, died Jan. 15, aged 57 years. He was the co-inventor of the first successful railway train dispatching system by telephone.

❖ ❖ ❖

HARRY MORRISON, who recently retired as auditor for the Carnegie-Illinois Steel Corp., Chicago, died on Jan. 24.

Bureau of Supplies and Accounts, Navy Department, Washington, will open bids Feb. 9 for 380 tons of high tensile steel plates and angles. On Feb. 2 the bureau will receive bids for 297 tons of sheet and bar steel.

PRECISION SCREENS

In the preparation of food products and in the screening, sizing and straining operations of chemicals, minerals, stone, coal and other materials, perforated metal plays an important part. H&K standards of quality and accuracy assure you of all that is best in screens. May we aid you in your selection?

Grilles of unusual beauty in exclusive designs suitable for public and commercial buildings and private homes. Ornamental sheets for radiator enclosures and metal furniture are furnished of any metal. Write us for prices and samples.

ANY METAL ANY PERFORATION

The Harrington & King Co.
PERFORATING

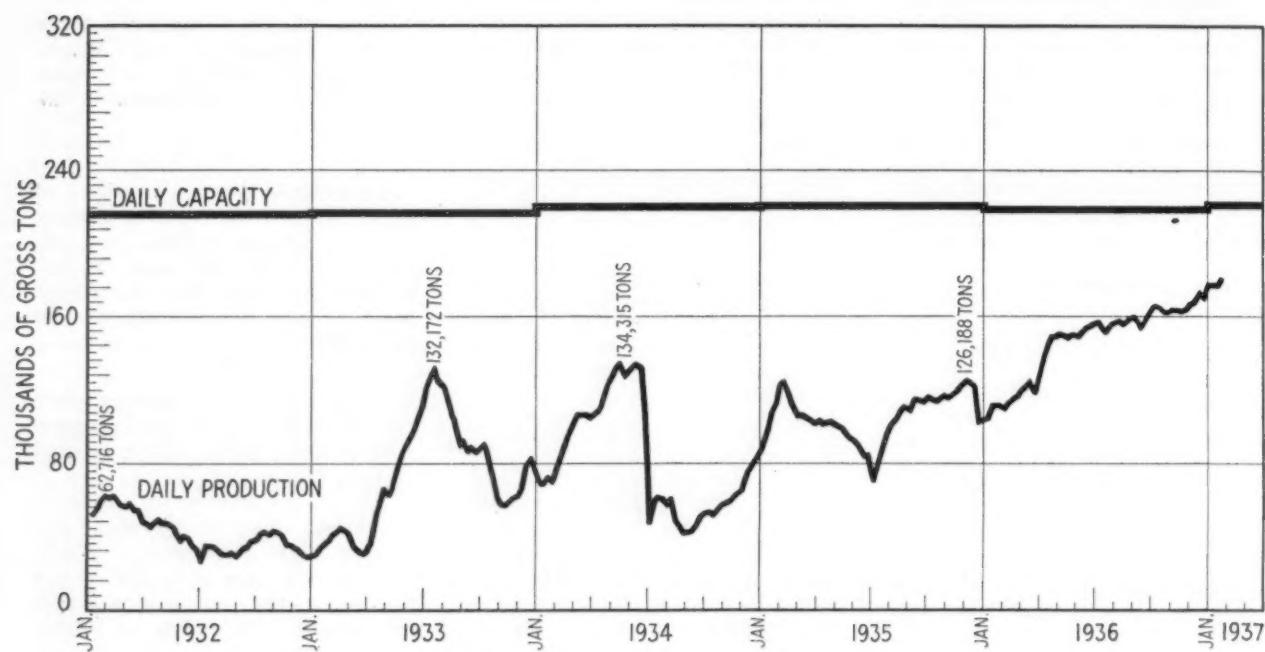
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114 LIBERTY ST., NEW YORK

STEEL INGOT PRODUCTION

Daily Tonnage of Bessemer and Open-Hearth Steel Ingots Produced by Weeks, 1933-1937

Current Week	Last Week	Jan. 25, 1936	Jan. 26, 1935	Jan. 27, 1934	Jan. 28, 1933
167,048	180,397	110,834	123,974	77,066	41,168



Figures for the current week are not indicated on the chart until the following week.

STEEL INGOT PRODUCTION BY DISTRICTS: Per Cent of Capacity

District	Current Week	Last Week	Weeks Ended		
			Dec. 26, 1936	Jan. 25, 1936	Jan. 26, 1935
Pittsburgh	80.0	82.0	78.0	37.0	36.0
Chicago	78.5	77.0	70.0	53.0	59.0
Valleys	77.0	77.0	84.0	62.0	63.0
Philadelphia	56.5	56.5	56.5	40.0	35.0
Cleveland	79.0	79.0	76.0	66.0	67.0
Buffalo	81.0	79.0	84.0	35.0	43.0
Wheeling	46.0	94.0	93.0	72.0	95.0
Southern	79.0	77.5	69.5	55.0	25.0
Ohio River	15.0	96.0	95.5	75.0	80.0
Western	91.5	91.5	76.5	40.0	35.0
St. Louis	75.0	75.0	75.0	69.0	33.0
Detroit	93.0	100.0	100.0	100.0	76.0
Eastern	95.0	95.0	85.0	40.0	45.0
Aggregate	75.0	81.0	78.0	51.0	51.5
Average Year to Date	79.9	80.0	67.1	50.4	47.0

Weekly Booking of Construction Steel

FROM THE IRON AGE

	Week Ended				Year to Date	
	Jan. 26, 1937	Jan. 19, 1937	Dec. 28, 1936	Jan. 28, 1936	1937	1936
Fabricated structural steel awards	58,500	12,950	28,875	28,700	121,125	81,500
Fabricated plate awards	3,260	2,175	11,970	875	11,840	45,025
Steel sheet piling awards	0	0	0	0	4,150	3,600
Reinforcing bar awards	1,275	2,600	2,515	27,460	10,220	62,210
Total Lettings of Construction Steel	63,035	17,725	43,360	57,035	147,335	193,335



... .SUMMARY OF THE WEEK. . . .

... Floods reduce steel operations in Wheeling and Cincinnati districts.

• • •

... Country's average down to 75 per cent; output higher at Chicago and Buffalo.

• • •

... Heavy structural steel orders placed; steel scrap composite advances again.

LOODS have reduced steel production sharply in the Ohio River valley, but elsewhere neither high water nor automobile strikes have appreciably affected the industry, which is working at top speed on heavy backlog plus a January volume of orders that for many companies exceeds that for any month last year excepting December.

The Wheeling and Cincinnati districts are hardest hit by flood waters. In the Wheeling district the plants of the Wheeling Steel Corp. and the Follansbee Brothers Co. and the Mingo Junction plant of Carnegie-Illinois Steel Corp. are virtually idle, but, with waters now receding, resumption of production is expected by the week end. The plants of the Andrews Steel Co. and the Newport Rolling Mill Co. at Newport, Ky., and the Ashland, Ky., unit of the American Rolling Mill Co. are idle, as are all machine tool plants, foundries and other industrial plants in the immediate Cincinnati territory, while the Middletown, Ohio, works of the American Rolling Mill Co. is down to about 50 per cent owing to diversion of electric power to the stricken district. Even if mills in the flooded areas were able to operate, railroad shipments would be impossible until the existing confusion has ended.

On Monday the American Iron and Steel Institute estimated the week's steel operating rate at 77.9 per cent of the country's capacity, but enforced shutdowns since then bring THE IRON AGE estimate to 75 per cent. The southern Ohio district is down to 15 per cent, the Wheeling district, to 46 per cent, and at Pittsburgh the temporary suspension of a few open-hearth furnaces has reduced the rate from 82 to 80 per cent. There has also been a slight loss at Youngstown.

The brighter side of the picture is that production has been increased at Chicago and Buffalo and is holding its own in other sections not affected by floods, except Detroit, where automobile

strikes have cut down the average rate from 100 to 93 per cent. Owing to floods or fears of water damage, tin plate production has been curtailed to 85 per cent from 97 per cent last week.

N Detroit sentiment is not hopeful for an immediate settlement of the General Motors imbroglio unless President Roosevelt intervenes. However, should resumption by strike-bound automobile plants and repairs to flood-damaged property come almost simultaneously, strong pressure on the mills for shipments, exceeding that of the most active periods of the past few months, is regarded as inevitable. In any event, steel production probably will be back to normal by next week.

Aggregate steel buying has declined slightly under the influence of floods and the continuance of the automobile strikes, but a heavy tonnage of heavy products for building construction has been placed on mill books. Fabricated structural steel lettings totaled 58,500 tons, the largest weekly total in more than two years; of this 28,000 tons is for electrification of the Pennsylvania Railroad line from Paoli to Harrisburg, Pa., 4600 tons for the Glenn L. Martin airplane factory at Baltimore, 4300 tons for the Apex Building, Washington, and 3160 tons for New York Central express highway work in New York.

Railroad equipment orders and inquiries are still a major market factor. The Baltimore & Ohio has ordered 2000 gondola cars and will build 2000 box cars in its own shops; the Northern Pacific will buy 2000 cars and 17 locomotives; the Chesapeake & Ohio will buy 1553 cars and the Missouri - Kansas - Texas 1254, and the Union Pacific has ordered 25 locomotives.

STEEL scrap has declined 50c. a ton at Pittsburgh, owing to flood conditions, but has risen 75c. at Chicago and \$1 at Philadelphia, where export buying is a strong influence. THE IRON AGE scrap composite has risen to \$18.83.

Lake Superior movement by water in 1937 is expected to exceed 50,000,000 tons, compared with 44,822,023 tons in 1936, and may require additional ships. Pittsburgh Steamship Co., subsidiary of United States Steel Corp., is asking bids on two that will take 12,000 tons of steel. An ocean liner to replace the *Leviathan*, requiring 16,000 to 20,000 tons of steel, may be built by the new Maritime Commission as the beginning of a substantial shipbuilding program. Settlement of the seamen's strike on the Pacific Coast, following the return to jobs on the Atlantic Coast, might hasten this program and would, incidentally, release a large tonnage of steel to replenish depleted Pacific Coast Stocks.



... Wheeling district, hardest hit by flood, down to 46 per cent operation.

• • •

... Operations in affected plants probably will be resumed by end of week.

• • •

... Finished steel demand slower; steel scrap declines 50c. a ton

PITTSBURGH, Jan. 26.—With the district's leading producer unaffected by flood waters, and the largest independent plant having curtailed operations for a few days as a precautionary measure, steel ingot output in the Pittsburgh district has moved down only two points from last week to 80 per cent of capacity. While the rivers reached a level of 10 ft. above flood stage, and considerable damage was done in this district, the amount was far below that caused by the disastrous situation last year, at which time the rivers rose 21 ft. above flood stage. Several blast furnaces in the district were banked as a precautionary measure, but most of them are now in blast and the remainder will be making pig iron within 24 hr.

The situation in the Wheeling district, however, presents a different picture. Out of four steel plants in that locality, only one is making steel this week. Consequently, the operating rate for the Wheeling district is down 48 points this week to 46 per cent of capacity. Operations in at least two of the smaller plants are expected to be resumed by the end of the week, while the remaining company will probably be able to start making steel by at least the first of next week.

If last year's flood experience is any criterion, there is little doubt that ingot production, both in the Pittsburgh and the Wheeling districts, will not only rebound to previous levels, but will reach a higher operating rate in order to make up for lost tonnage. Obviously, the demand for steel for re-

habilitation purposes will be of no small moment.

Aggregate demand for finished steel products in the past week has slowed up some, but bookings of pipe, wire and sheets continue in fair volume. Backlogs of heavy plates and shapes are still mounting as the deadline for submitting specifications nears. Hot rolled and cold finished bar orders are in slightly less volume than a week ago. Total tonnages booked so far this month, however, preclude any rapid working off of heavy backlogs and operations in the district will be maintained around present levels for the next month at least.

Reflecting the current tight situation in furnace coke, the leading steel producer's coal and coke subsidiary is reopening more than 700 beehive coke ovens in the Connellsville district. These plants have not been operated for several years.

Heavy melting steel has slipped off 50c. a ton, owing to the flood situation and absence of consumer buying.

Pig Iron

Tonnages moving to sanitary and heating interests are heavier than at this time last year owing to greater industrial and home building activity. Orders continue on a spot basis, but shipments are at practical capacity. Some merchant producers are attempting to add to their depleted inventories in order to keep up with seasonal demand later in the year. There is still no evidence of speculative stocks in customers' hands as current consumption continues at high levels. Jobbing foundry business has shown improvement. Some

steel stacks were temporarily banked last week as a precautionary measure, owing to flood waters.

Semi-Finished Steel

Specifications are holding up and compare favorably with November tonnages. Despite the influx of orders last month, new business is showing no signs of drying up. That the semi-finished market is in a strong position is shown by the inability of many integrated mills to produce any more material than their own requirements. Sustained demand for finished products is causing non-integrated makers to revise their requirements upward. Lending significance to the raw material picture will be the construction soon of a blooming mill with a 1,000,000 tons annual capacity by the district's leading producer. That additional steel-making capacity will be constructed in this district is a foregone conclusion.

Bolts, Nuts and Rivets

Orders are as good as a week ago. Miscellaneous demand is holding up well and bookings from small manufacturing and fabricating shops are in steady volume. The jobbing trade is specifying fair tonnages, even though they ordered heavily last month. Orders from railroad repair shops have eased off some, but this is considered to be temporary. Meanwhile, shipments to large fabricators and car builders are exceptionally heavy and as yet producers' schedules have not been affected by suspension of automotive orders. Local bolt and nut plants for the most part have escaped damage from flood waters.

Bars

Specifications this week are slightly behind the volume received a week ago. There is nothing in the fluctuation to indicate anything out of the ordinary. Deliveries are still obtainable in three to four weeks, but no large dent is being made in backlogs, owing to the level of current business. With some open hearths in the district banked as precautionary measures against high water, production schedules may be interfered with to some extent, owing to lack of raw steel. While mills have been able to re-schedule orders without affecting total operations, undue prolongation of the automobile suspensions will undoubtedly be felt to some extent.

Cold-Finished Bars

Specifications have slowed up some in the past week, but deliveries are still no better than six weeks. Meanwhile, shipments are exceptionally heavy and rather

A Comparison of Prices

Market Prices at Date, and One Week, One Month, and One Year Previous;
Advances Over Past Week in Heavy Type, Declines in Italics

Rails and Semi-finished Steel

	Jan. 26, 1937	Jan. 19, 1937	Dec. 28, 1936	Jan. 28, 1936
Per Gross Ton:				
Rails, heavy, at mill.....	\$39.00	\$39.00	\$39.00	\$36.37 $\frac{1}{2}$
Light rails, Pittsburgh.....	38.00	38.00	38.00	35.00
Rerolling billets, Pittsburgh.....	34.00	34.00	34.00	29.00
Sheet bars, Pittsburgh.....	34.00	34.00	34.00	30.00
Slabs, Pittsburgh.....	34.00	34.00	34.00	29.00
Forging billets, Pittsburgh.....	40.00	40.00	40.00	35.00
Wire rods, Nos. 4 and 5, P'gh.....	43.00	43.00	43.00	40.00
Skelp, grvd. steel, P'gh, lb.....	Cents	Cents	Cents	Cents
	1.80	1.80	1.80	1.80

Finished Steel

	Per Lb.:	Cents	Cents	Cents	Cents
Bars, Pittsburgh.....		2.20	2.20	2.20	1.85
Bars, Chicago.....		2.25	2.25	2.25	1.90
Bars, Cleveland.....		2.25	2.25	2.25	1.90
Bars, New York.....		2.55	2.55	2.55	2.20
Plates, Pittsburgh.....		2.05	2.05	2.05	1.80
Plates, Chicago.....		2.10	2.10	2.10	1.85
Plates, New York.....		2.33	2.33	2.34	2.09
Structural shapes, Pittsburgh.....		2.05	2.05	2.05	1.80
Structural shapes, Chicago.....		2.10	2.10	2.10	1.85
Structural shapes, New York.....		2.305	2.305	2.31 $\frac{1}{4}$	2.06 $\frac{1}{4}$
Cold-finished bars, P'gh.....		2.55	2.55	2.55	2.10
Hot-rolled strips, P'gh.....		2.15	2.15	2.15	1.85
Cold-rolled strips, P'gh.....		2.85	2.85	2.85	2.60
Hot-rolled annealed sheets, No. 24, Pittsburgh.....		2.80	2.80	2.80	2.40
Hot-rolled annealed sheets, No. 24, Gary.....		2.90	2.90	2.90	2.50
Sheets, galv., No. 24, P'gh.....		3.40	3.40	3.40	3.10
Sheets, galv., No. 24, Gary.....		3.50	3.50	3.50	3.20
Hot-rolled sheets, No. 10, Pittsburgh.....		2.15	2.15	2.15	1.85
Hot-rolled sheets, No. 10, Gary.....		2.25	2.25	2.25	1.95
Cold-rolled sheets, No. 20, Pittsburgh.....		3.25	3.25	3.25	2.95
Cold-rolled sheets, No. 20, Gary.....		3.35	3.35	3.35	3.05
Wire nails, Pittsburgh.....		2.25	2.25	2.25	2.40
Wire nails, Chicago dist. mill.....		2.30	2.30	2.30	2.45
Plain wire, Pittsburgh.....		2.60	2.60	2.60	2.30
Plain wire, Chicago dist. mill.....		2.65	2.65	2.65	2.35
Barbed wire, galv., P'gh.....		2.75	2.75	2.70	2.80
Barbed wire, galv., Chicago dist. mill.....		2.80	2.80	2.75	2.85
Tin plate, 100 lb. box, P'gh*.....	\$4.85	\$4.85	\$4.85	\$5.25	

*Practically the equivalent of previous quotations owing to new method of quoting effective Jan. 1, 1937.

On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

The Iron Age Composite Prices

Finished Steel

Jan. 26, 1937
One week ago
One month ago
One year ago

2.330c. a Lb.
2.330c.
2.330c.
2.130c.

Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strips. These products represent 85 per cent of the United States output.

High

Low

1937..... 2.330c., Dec. 28: 2.084c., Mar. 10
1936..... 2.130c., Oct. 1: 2.124c., Jan. 8
1935..... 2.199c., April 24: 2.008c., Jan. 2
1934..... 2.015c., Oct. 3: 1.867c., April 18
1933..... 1.977c., Oct. 4: 1.926c., Feb. 2
1932..... 2.037c., Jan. 13: 1.945c., Dec. 29
1931..... 2.273c., Jan. 7: 2.018c., Dec. 9
1930..... 2.317c., April 2: 2.273c., Oct. 29
1929..... 2.286c., Dec. 11: 2.217c., July 17
1928..... 2.402c., Jan. 4: 2.212c., Nov. 1

Pig Iron

\$20.25 a Gross Ton
20.25
19.73
18.84

Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

High

Low

1937..... \$19.73, Nov. 24: \$18.73, Aug. 11
1936..... 18.84, Nov. 5: 17.83, May 14
1935..... 17.90, May 1: 16.90, Jan. 27
1934..... 16.90, Dec. 5: 13.56, Jan. 3
1933..... 14.81, Jan. 5: 13.56, Dec. 6
1932..... 15.90, Jan. 6: 14.79, Dec. 15
1931..... 18.21, Jan. 7: 15.90, Dec. 16
1930..... 18.71, May 14: 18.21, Dec. 17
1929..... 18.59, Nov. 27: 17.04, July 24
1928..... 19.71, Jan. 4: 17.54, Nov. 1

Steel Scrap

\$18.83 a Gross Ton
18.42
17.75
13.58

Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

High

Low

1937..... \$18.83, Jan. 26: \$17.92, Jan. 4
1936..... 17.75, Dec. 21: 12.67, June 9
1935..... 13.42, Dec. 10: 10.33, April 23
1934..... 13.00, Mar. 13: 9.50, Sept. 25
1933..... 12.25, Aug. 8: 6.75, Jan. 3
1932..... 8.50, Jan. 12: 6.43, July 5
1931..... 11.33, Jan. 6: 8.50, Dec. 29
1930..... 15.00, Feb. 18: 11.25, Dec. 9
1929..... 17.58, Jan. 29: 14.08, Dec. 3
1928..... 16.50, Dec. 31: 13.08, July 2
1927..... 15.25, Jan. 11: 13.08, Nov. 22

large releases are being received from those automobile companies unaffected by shutdowns.

Reinforced Bars

New business is light. This is to be expected in view of the heavy commitments placed previous to the price advance. Producers are endeavoring to reduce low price commitments as far as possible. Jobbers ordered freely last month in order to anticipate not only the price increase but a spring demand which is expected to top the level of a year ago.

Steel Sheet Piling

The Flushing Bay, N. Y., boat basin project involving 1800 tons, recently postponed, has been rebid with Tully & Di Napoli, New York, the low bidders. Rodgers & Haggerty, New York are the general contractors for the tide gate and dam project at New York involving 1800 tons, and the piling award is expected soon. The United States Engineers office at Fort Peck, Mont., will take bids on 387 tons of piling on Jan. 28.

Plates and Shapes

Privately financed projects continue to be more numerous than Government sponsored jobs. The majority of inquiries this week comprise factory additions and public utility buildings. The American Bridge Co. will fabricate 3160 tons of material for an express highway viaduct in New York and will furnish 550 tons of plates and shapes for the reconstruction of bridges over the New York Central Railroad in the Bronx, New York. Fair-sized barge inquiries are pending and awards are expected shortly. In view of the heavy specifications placed during this month, new inquiries and awards are below those previously reported.

Tin Plate

Owing to flood conditions, tin plate operations are down 12 points this week to 85 per cent of capacity. Following the experience gained during the flood last March, local producers have taken precautionary measures by moving tin plate stocks to higher levels. Bookings continue in good volume with both general line can and packers' specifications showing some improvement. Export business is satisfactory and is in better volume than a year ago.

Sheets

New business is about on a par with a week ago and backlogs are showing no changes. Demand is miscellaneous and the only interpretation producers can place on the satisfactory volume of fresh orders is that consumers are badly

in need of steel, notwithstanding heavy commitments placed before the price advance. Automobile suspensions have not yet affected local rolling mill operations.

Strip

While not equal to the volume received last month, new business continues to show improvement. Last week's aggregate bookings were on a par with November tonnages. Producers can do without suspended automotive tonnages for several more weeks before lowering operating schedules. Furniture, radio and electrical appliance manufacturers are in the market with fair-sized orders. Specifications from structural and hardware builders are also good.

Tubular Products

With inventory season over and a further increase in home and factory building, jobbers are replenishing their stocks of standard pipe. This item is moving at a faster pace and gives promise of even better activity far into 1937. Specifications for oil-country goods continue their upward march with current business considerably better than this time last year. Practically all material is going into immediate consumption. Both stationary and locomotive boiler tubes are active.

Wire Products

Wire producers are receiving a fairly steady flow of orders and the delivery situation is no better than a week ago. Pressure is being exerted from some quarters for faster shipments. Present unfilled tonnage assures a good operating rate for at least the next 40 days. Merchant wire inquiries are a little better but in the aggregate are lower than a month ago.

Coal and Coke

Movement of coal and coke by water was impossible last week owing to flood conditions, and shipments are still curtailed. Industrial consumers dipped into surplus stocks accumulated in anticipation of possible labor disturbances. Persistence of extremely mild weather has resulted in large accumulations of domestic coal and coke. Beehive coke producers with crushing plants have been diverting their coke to the spot furnace trade when the quality was satisfactory. Some brokers have been buying these supplies to apply on furnace contracts. A few domestic beehive coke producers have been pulling their ovens three times a week instead of five. No weakness is apparent, however, in the furnace and foundry coke market as outstanding contracts are taking every available ton.



... Pig iron shortage is less acute.

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... Sheet buyers paying premiums for delivery.

ONDON, Jan. 26 (By Cable).— Pig iron stringency is less acute. Delivery arrears have been reduced and more has been released for export, but makers are still obliged to restrict new business and to ration supplies. Scrap is very scarce and the Government may ban exports. Steel mills are working at full capacity on orders for constructional and shipbuilding materials, rails and armaments, and producers are unable to reduce delivery arrears.

A remarkable revival of export demand for black and galvanized sheets has been unchecked by the price advance and works are fully sold months ahead and are refusing orders. Home prices on sheets are officially unaltered, but sales are being made at substantial premiums.

Pending the conclusion of the discussions with the International Steel Cartel on heavy steel export prices, British steelmakers have ceased quoting for structural and tank plates in non-Empire markets, and for plates and sections for shipbuilding in any export market.

There is a good home and export demand for tin plates in anticipation of higher prices. Tin plate mills are experiencing great difficulty in obtaining steel. The usual big Canadian order for American Can Co. plants has been renewed for 1937.

Continental iron and steel home and export sales are suspended temporarily so that, despite strong demand, the turnover is small. The raw material shortage is causing growing anxiety.

British prices for finished steel for Empire markets except Canada have been raised 12s. 6d. Continental gold prices are unchanged



CHICAGO

... Western district unaffected by automobile strikes or floods.

... Ingot production moves up to 78½ per cent of capacity.

... Farm machinery and railroad equipment companies pressing for steel.

CHICAGO, Jan. 26.—Ingot production has pushed forward one and one-half points to 78½ per cent of capacity. Specifications for finished steel give no indication of a downward swing. Mills are trying to adjust upward the rate of rolling rails, being fully aware that the spring track work period is near at hand. The main factor working against this program is the acute shortage of raw and semi-finished steel.

Effects of automobile strikes are of no great moment in this district, where all classes of users are pressing hard for shipments. The farm implement manufacturers are so insistent for steel that it is evident production schedules could be pushed higher than they now stand. Tractor plants have excellent order books and their pressure for steel is no less intense than that of the other farm groups. Car builders are releasing freely and the peak of their demand is still a few weeks distant as gaged by business now in sight. The matter of deliveries is distressing to car shops, which are having trouble placing siding sheets for box cars.

The situation as to mill books is best illustrated by the fact that steel which cannot be delivered in the first quarter is being added to books with the understanding that it will be priced at such quotations as will prevail in the second quarter.

The scrap market is again on the upward march and, having gained new high ground, shows no signs of leveling off.

Pig Iron

Foundries in western Michigan and the Chicago territory are practically unaffected by the automobile strikes and shipments are running

about even with the December volume. Books are heavy and new buying is confined to scattered car lots at the new prices.

Bars

Hold-up orders issued by strike-bound automobile plants are not disconcerting to Chicago mills, which are shipping against specifications at a rate approximating capacity. Automobile parts makers in and around Chicago are feeling strike effects, but bar tonnages which they cannot take are diverted to other consumers. In fact, the strike situation has had far less effect than mill operators had anticipated. Agricultural implement builders are speeding operations and putting delivery pressure on all classes of suppliers. Tractor plants report excellent demand from all sources and they, too, are pressing for steel deliveries.

Plates

Local mills are enjoying the best business in years, and prospects are that shipments will grow during the next few weeks. Car shop needs are heavy, but the top has not been reached and almost every railroad repair shop is making use of quantities of new steel. Plates will now be ordered for two Mississippi River dams, contracts for which have been let. Large tonnages in the forms of tanks and line pipe are absent, but shops report a substantial flow of small business, and plate fabricators are busy.

Structural Material

Indications are that the cream of the specified project tonnage is now out of the market. Buyers have to the end of the month in which to place orders, but the peak of the run to cover appears to

have passed, and mills are not looking for heavy commitments at fourth quarter prices during the closing days of this month. All old-priced material must be specified within 60 days from Jan. 31 for shipment at the convenience of mills. Two Mississippi River dams have been placed and two others are up for figures.

Rails

Production of rails and track supplies is slowly being lifted. Current production of rails is slightly above 50 per cent, but will go higher soon as the track laying season is not many weeks away and railroads' needs will then be heavy.

Wire Products

Wire mills are accepting for first quarter shipment only such orders as can be definitely fitted into production schedules; otherwise, customers are told that they will go over to the second quarter, with shipments to be made at the prices then ruling. Production is up about five points to 80 per cent of capacity. Wire drawing blocks are so well engaged that mills cannot add to stocks of merchant products, which are only 50 per cent of normal with the spring buying movement by jobbers only a few weeks away. Flooded areas cannot now be served with wire products, but recession of the waters will undoubtedly bring a heavy demand for rehabilitation of damaged properties.

Sheets

Demand continues to run high and mills are exercising extreme caution in the matter of their ability to make deliveries at current prices within the quarter. Some orders are now being entered which will be priced at the quotations in effect for delivery after April 1. Inability to meet delivery requirements is resulting in some railroad car siding and roofing orders are being peddled from mill to mill in an effort to secure early deliveries.

Reinforcing Bars

This market is more or less in a state of suspension because of wintry weather, which causes contractors to be indifferent about placing orders with fabricators. A considerable tonnage, which promises much for open weather work, is overhanging the market. Prices are still troublesome except on small lots, and this condition may not be improved by the hold-back attitude of contractors. More than 20 Chicago public schools, requiring over 800 tons of bars, may soon be awarded. Illinois is taking bids on a number of small bridges, and

some small lots of road slab work are making their appearance.

Cast Iron Pipe

New buying and releases are light, which is a usual condition in January. However, there is a bright side to the market and that is the utilities are showing signs of life, one having purchased about a mile of pipe and another being in the market for a similar amount. The Sanitary District, Chicago, is buying current needs, but other public work lies dormant pending open weather.



... Railroads to spend \$50,000,000 this year.

• • •

... Automobile companies also plan large expenditures.

TORONTO, Jan. 26.—Approximately \$50,000,000 will be spent during the current year by Canadian railroads and the automotive industry on new equipment, rails and machinery, according to estimates released to date. Of this total, some \$40,000,000 will be expended by the Canadian National and Canadian Pacific. Contracts covering several millions of dollars for railroad equipment will be awarded within the next few days. Recently the two companies called for tenders on rolling stock and it is expected that orders will be placed with Canadian Car & Foundry Co., National Steel Car Co., Eastern Car Co., and other companies. Financing assistance for this new business will be given by the Dominion Government. The C.N.R. orders will be for freight and passenger cars while the C.P.R. mainly is interested in box cars. Orders now pending, on which bids have been called, will be sufficient to keep the various plants receiving awards busy until early next summer, by which time it is expected that additional business will be forthcoming. No reports of locomotive contracts so far have been announced. The Algoma Steel Corp., Sault Ste. Marie, Ont., has received an order for 20,000 tons of steel rails from the Canadian Pacific.

J. L. Stewart, general manager of the Canadian Automobile Cham-

ber of Commerce, has announced that the Canadian automotive industry intends to spend \$8,150,000 for improvement to plant and equipment, which compares with \$3,010,665 spent last year. The major item in this expenditure is a \$5,000,000 outlay for the Ford Motor Co. of Canada, of which \$2,500,000 will be for new body and assembly plant at Windsor, which will be 570 x 1000, concrete, brick and steel construction, while in addition \$1,400,000 will be spent for new machinery and \$1,000,000 for other new equipment. In addition, \$400,000 will be spent on a new branch assembly plant at Vancouver. Outlay by General Motors will be approximately \$3,000,000.

A contract for the steel superstructure for the Lions Gate bridge over Vancouver harbor has just been awarded to the Dominion Bridge Co. and the Hamilton Bridge Co., and some 10,000 tons of steel will be required.

The improvement taking place in various branches of the iron and steel industry is reflected in increased demand for raw materials, and merchant pig iron sales are improving accordingly. Sales for the past week reached close to 1400 tons, and it is stated that inquiries for iron are steadily increasing in number with larger tonnage involved in spot sales. A number of melters also have covered for first quarter and local blast furnace representatives state that current demand is at the highest level since 1930, with melters showing more interest with regard to forward delivery contracts. Pig iron prices also are showing strength and both Toronto and Montreal prices have been marked up \$1 per ton. Despite this advance, however, Canadian prices still remain under the Buffalo base price.

Trading in iron and steel scrap also is showing improvement, both in the Toronto and Montreal districts, with active markets prevailing both for iron and steel grades. Local dealers state that they have been drawing heavily on yards stocks for some time and at present shipments greatly exceed intake. New offerings largely are confined to producers, with little scrap being offered from rural districts.

Canadian Pig Iron

Per Gross Ton

Delivered Toronto

No. 1 fdy., sil.	2.25 to 2.75	\$22.00
No. 2 fdy., sil.	1.75 to 2.25	21.50
Malleable		22.00
Basic		21.50

Delivered Montreal

No. 1 fdy., sil.	2.25 to 2.75	\$23.50
No. 2 fdy., sil.	1.75 to 2.25	23.00
Malleable		23.50
Basic		23.00



Northern Pacific will spend approximately \$32,000,000 this year for equipment and maintenance. Of this total, more than \$13,000,000 will be expended for new equipment, including nine Mallet type freight locomotives and eight 4-8-4 passenger locomotives, 500 box cars, 500 flat cars, 1000 gondola cars, and remodeling and air-conditioning 29 passenger cars. Improvements to existing passenger and freight cars will total \$1,800,000.

Chesapeake & Ohio has applied for authority to issue \$4,000,000 in equipment trust certificates in connection with the purchase of new equipment to cost \$5,081,353. Equipment to be purchased includes 1000 50-ton hopper cars, 500 to be bought from Pullman-Standard Car Mfg. Co. and 500 from American Car & Foundry Co.; 500 50-ton box cars from General American Transportation Co., 50 cabooses from Major Car Corp., and three all-steel passenger and baggage trailer cars from Bethlehem Steel Co. The railroad recently placed orders for 50 40-ton stock cars with Greenville Steel Car Co., 25 70-ton dry bulk hopper cars with American Car & Foundry Co., and 10 horse express cars with St. Louis Car Co.

Missouri-Kansas-Texas has applied for authority to issue \$3,750,000 in equipment trust certificates to finance purchase of equipment to cost \$4,794,850, including 500 gondola cars, 500 stock cars, 225 automobile cars, 25 chair cars, three dining cars and one lounge car. Contract for gondola and stock cars has been placed with the railroad's subsidiary, Missouri-Kansas-Texas Railroad Co. of Texas. Remaining equipment will be purchased through competitive bidding.

Union Pacific has ordered 25 4-6-6-4 type locomotives from American Locomotive Co. This is in addition to 15 similar locomotives ordered the last half of 1936.

Baltimore & Ohio has authorized purchase of 2000 70-ton gondola cars, previously reported as 1500 cars, for which Bethlehem Steel Co. is low bidder, and will build 2000 50-ton covered wagon top box cars in its own shops.

Navy Department, Washington, will receive bids Feb. 2 on two 50-ton box cars.

RAILS AND TRACK SUPPLIES

Lehigh & New England has ordered 700 tons of 130-lb. rails from Bethlehem Steel Co., and 500 tons from Carnegie-Illinois Steel Corp., together with necessary tie plates.

Northern Pacific has divided 10,000 tons of rails among Carnegie-Illinois Steel Corp., Bethlehem Steel Co. and Colorado Fuel & Iron Co.

River Barge Orders Largest Since 1929

Expanding industrial activity resulted in a sharp spurt in the production of marine floating equipment last year and gave the engineering works division of the Dravo Corp., Pittsburgh, the greatest volume of business in tonnage since 1929, according to officials of the company.

The organization, which specializes in the construction of river and harbor equipment, produced 104 vessels with a total tonnage of 47,786, compared with 35 vessels and a tonnage of 15,439 in 1935. Dravo's new business on the books on Jan. 1, 1937, called for the construction of 39 vessels with a tonnage of 18,529.



.. PHILADELPHIA ..

... Heavy melting steel scrap rises to \$18.50 per ton.

... Business at new prices continues to come in at a good rate.

... Operations unchanged at 56½ per cent of capacity.

PHILADELPHIA, Jan. 26.—The feature of the market here is the strength of heavy melting steel scrap, which after a steady rise over the past few months, went up \$1 this week to \$18.50 per ton, with some brokers reporting unconfirmed sales at \$19, almost a legendary figure for this district. No. 2 steel is quoted at \$17.50, which was the price for No. 1 steel last week, with \$18 sales reported. All indications point to still higher quotations for this material over the next few weeks. Present levels are the highest since January, 1925, when a price of \$20 was reached.

New business is being received in fair volume by local steel sales representatives. Demand has slackened a very little, perhaps, but the closing of identified structures before the deadline of Jan. 30 is expected to more than make up for any easing at the moment. Backlogs are unchanged for the most part, but in some mills are actually being extended owing to rolling and shipping delays, and the steady influx of new orders. Jobbers are active in all lines, but particularly in pipe and sheets. Because of heavy coverage throughout the trade, sales of wire and wire products have been light recently.

No further suspensions of business on account of the automobile strike are known other than those reported in the body-stamping plants last week. Production is slightly affected, however, in the Philo radio plant here, because of hold-ups in Chrysler assembly due to strikes in plants supplying glass to this company. The floods in Ohio, Indiana and Kentucky have had little effect in this area and probably will not, except as shipments to and from, or through that territory may be delayed. Motors

and other equipment have been moved to higher quarters in the Leetsdale plant of Bethlehem Steel Co., due to rising Ohio River waters.

Operations remain at 56½ per cent of capacity, with a possibility of one or two units being added within a few weeks. One mill is already being forced to resort to a stock of ingots banked several months ago, and, if demand continues at present levels, the starting up of another open-hearth is certain.

Pig Iron

Current business is quiet, and another month may elapse before buying in any quantity gets underway once more. Some producers would like to increase the amount of iron in open-hearth mixes, but it is all they can do to maintain the regular ratio without diverting tonnage from contracts. The booming scrap market may cause another upward move in pig iron, some believe, although there are many here who advise against such a move.

Sheets and Plates

Although sheets and strip were by far the most heavily ordered products in December's buying movement, there are a few mills where deliveries of from three to four weeks may be obtained, as opposed to most of the others, which are booked to capacity to the end of the quarter and beyond. Sheet jobbers are actively engaged, and stove and furnace makers, as well as other manufacturing trades, are also taking their quota of sheets. Plates are not so active as sheets, local mills being able to make delivery in two to four weeks. The Pennsylvania has started in a small way its large program for the repair and rebuilding of 24,000

cars and 1800 locomotives, and has awarded the construction of five small barges, each requiring 82 tons of plates, to the Dravo Contracting Co., Pittsburgh.

Shapes and Bars

Award of about 28,000 tons of shapes for the Pennsylvania Railroad's electrification program from Paoli to Harrisburg was reported from usually reliable sources. Bethlehem Steel Co. received about 14,000 tons, while the remainder was understood to have been divided among several companies, including American Bridge Co. and Lehigh Structural Steel Co. Bethlehem also was awarded 4600 tons of shapes for the Glenn L. Martin airplane factory addition in Baltimore. The steel for the Apex building in Washington, 4300 tons, went to Fort Pitt Bridge Works Co. Bids will be taken Feb. 5 on two bridges for the Pennsylvania department of highways totaling 850 tons of structural shapes. Reinforcing bars are quiet, with the award of the 700 tons of bars for two Philadelphia schools to be made through McCloskey & Co., contractors, late this week.

Imports

The following iron and steel imports were received here last week: 10 tons of charcoal bar iron, 10 tons of cold drawn steel wire, 18 tons of steel forgings, 46 tons of steel tubes and 26 tons of steel bars from Sweden; 285 tons of steel bars, 79 tons of steel bands and 462 tons of structural shapes from Belgium.



... Pig iron shipments are at good rate.

BOSTON, Jan. 26.—Pig iron buying is confined to a few scattered small lots, but furnaces are busy making shipments against old contracts. Barring unforeseen developments, some foundries will be in the market next month for iron, but no large buying movement is expected. Melters are taking by-product foundry coke freely.

New England industrially continues to do very well. Only one concern, a Maine mill making upholstery, has been seriously affected by the General Motors strike. There are, however, rumblings among molders regarding wages, but these have not become general.



... Steel buying continues at fairly good rate.

• • •

... Agricultural implement industry at capacity.

ST. LOUIS, Jan. 26.—Business in finished steel continues at a fairly brisk rate. Orders continue to come in for hot-rolled sheets for first quarter, but it is problematical as to deliveries on such orders in view of the heavy backlog of orders already placed with the mills. Fabricators of structural steel are placing some tonnage for contracts in hand, but few new awards are being made. Business in wire products is light.

Only a few sales of pig iron were made during the week, a carload here and there, as nearly all melters in the district already have placed orders for first quarter consumption. Shipments against these contracts continue heavy. The melt in the St. Louis area is said to be greater than the peak of middle December. The agricultural implement manufacturers in the Tri-Cities and in Peoria are working at full capacity. The washing machine industry has taken on a new spurt. The stove foundries in Belleville and farther north are extremely busy again, with some concerns operating at full speed.



... Steel mills, machine tool shops and foundries closed by flood.

CINCINNATI, Jan. 26.—With Cincinnati under city manager dictatorship, owing to serious flood conditions, all machine tool plants, foundries and other industries are shut down for the duration of the flood, this having been done to conserve electric power, water supply and other necessities for essential needs.

The Ashland unit of the American Rolling Mill Co., the mills at Portsmouth and those of the An-

drews Steel Co. and the Newport Rolling Mill Co. are closed, including open hearth furnaces. At Middletown, the American Rolling Mill Co. is operating sheet and galvanizing departments. Five open hearth furnaces are on, but may be cut to three before the end of the week. The strip mill at Middletown is being repaired during this period of enforced idleness. The shutdown for repairs was scheduled for Feb. 6, but the emergency has made it possible to make repairs now instead. The Middletown plant is using only 40 per cent of its normal amount of power, having given up that which comes from Cincinnati in order to relieve conditions here.

Mills are encountering difficulties in obtaining freight cars, so even if production were not curtailed there would be a considerable reduction in the volume of steel shipments from this area.



... Operations continue at a steady pace.

• • •
... Backlogs will sustain high rate for months.

BIRMINGHAM, Jan. 26.—Iron and steel operations continue at a steady pace. Backlogs and current bookings will likely sustain this condition for some months to come. There is a fair run of new business, both in steel and pig iron.

Eighteen open hearths were active last week, as compared with 17 the preceding week, and 18 are again scheduled this week. Tennessee Coal, Iron & Railroad Co. is operating eight out of nine at Fairfield, five out of nine at Ensley; Gulf States Steel, five out of six at Gadsden.

There has been no recent change in the number of active blast furnaces, 15. Tennessee Coal, Iron & Railroad Co. is operating seven; Woodward Iron Co., three; Republic Steel Corp., two; Sloss-Sheffield Steel & Iron Co., three.

The resumption of the red ore mine strike of the Tennessee Coal, Iron & Railroad Co., threatened for several weeks, has not yet materialized. Negotiations are still in progress, but no agreement has been reached.

National Cast Iron Pipe Co. has

been given an order for approximately 14,000 ft. of cast iron pipe, ranging in size from 3 to 20 in., for lateral lines of the Birmingham industrial water system.

Nickerson & Co., New York, has been awarded contract for the construction of 12 storage bins and auxiliary facilities for the new cement plant to be built at Leads, Ala., by the Universal Atlas Cement Co., to replace the existing plant established 27 years ago. The new plant, as previously reported, is expected to cost around \$2,500,000.



Board of Contract and Supply, Municipal Building, 550 Main Street, Hartford, asks bids until Feb. 1 for 3500 ft. of 48 and 54-in. electrically-welded steel pipe and fittings, lined, coated and wrapped; also for about 41 tons of 48 and 54-in. cast iron pipe and fittings, bell and spigot, and flanged, and for 1½ tons of 12 and 16-in. similar pipe and fittings, flanged; sluice gates, gate valves and cone valve. Richard Dillon is clerk.

D. D. Oil Co., Mission, Tex., F. D. Davenport, president, plans welded steel crude oil pipe line from connection with present pipe line system to terminals at Brownsville and Port Isabel, Tex., passing through points in Hidalgo and Starr counties.

Panhandle Eastern Pipe Line Co., 101 West Eleventh Street, Kansas City, Mo., has plans for new 20-in. welded steel pipe line from natural gas field at Amarillo, Tex., to Dana, Ind., and Detroit. Line will be almost 900 miles long and will duplicate present pipe line of company between same points. Booster plants will be built along route. Cost close to \$10,000,000.

Gulf Refining Co., Tulsa, Okla., has let contract to Kelley Dempsey & Co. for a seven-mile, 10-in. Lindewelded steel pipe line near Eunice, N. M., for crude oil transmission.

Phillips Petroleum Co., Bartlesville, Okla., plans 24-in. welded steel pipe line from gas field in Moore County, Tex., near Sunray, to gasoline plant at Rock Creek, Hutchinson County, Tex. New line will duplicate an existing pipe line between same points.

Standard Oil Co. of California, Inc., 225 Bush Street, San Francisco, plans two 8-in. welded steel pipe lines for submarine oil-loading lines, extending from sea end of an existing 16-in. steel pipe line to company wharf in Estero Bay, Cal., about 1830 ft. New 3-in. submarine water pipe line also will be installed.

Continental Pipe Line Co., Ponca City, Okla., has let contract to Williams Brothers Corp., National Bank of Tulsa Building, Tulsa, Okla., for 6-in. Lindewelded steel pipe line from Guthrie to Crescent, Okla., about 16 miles, and for 4-in. similar welded steel pipe line from Orlando to Lucien, Okla., about 2½ miles, for crude oil transmission.

Bureau of Reclamation, Denver, will ask bids early in spring for new dam on Pine River, near Bayfield, La Plata County, Colo., to include two 86-in. welded steel pipe lines for water service in connection with new reservoir at that place.

Skelly Oil Co., Tulsa, Okla., has let contract to Truman Smith Construction Co. for a 20-mile steel pipe extension from its 6-in. oil pipe line at Lorraine, Kan. Seamless steel pipe in 40-ft. lengths will be used, all joints to be Lindewelded.



... CLEVELAND ...

... Flood affects steel plants in southern Ohio and Kentucky.

... Northern Ohio mills suffer minor interruptions; freight movement curtailed.

... 1937 ore movement may exceed 50,000,000 tons; two new boats may be built.

CLEVELAND, Jan. 26.—Flood conditions have only slightly affected steel plant operation in northern Ohio, but have badly crippled the steel industry in the Cincinnati district. Ingot output in the Cleveland-Lorain district is unchanged this week at 79 per cent of capacity. In the Youngstown district the output is down one point to 76 per cent of capacity, the drop being due to interruptions caused by the high water, which caused the shutdown Monday of the open-hearth furnaces at the Campbell plant of the Youngstown Sheet & Tube Co. for one turn. There were also some interruptions of mill operations in both Youngstown and Warren.

In the Cincinnati district, Newport, Ky., steel plants are shut down and at Middletown the American Rolling Mill Co. reduced operations to 50 per cent because of curtailment of its outside power supply.

Shipments of foundry coke from Ashland and Portsmouth have been suspended for several days, causing an acute shortage of coke. Some foundries have been able to secure fuel from other sources, but these have little coke to spare. Rail and truck shipments of steel also have been interrupted.

Rehabilitation of the devastated Ohio River cities and replacement of bridges are expected to require large quantities of steel.

The volume of business in finished steel has subsided to a point where it is regarded as around normal. Shipments are heavier than the incoming tonnage, making the delivery situation somewhat easier. However, there is still considerable pressure for deliveries, and finishing mills are maintaining

operations at near capacity except where flood waters interfere. Most sheet mills have orders for all the material they can produce during the first quarter and some are turning away business, declining to take any tonnage they cannot ship during the quarter. However, some orders have been taken for April delivery.

American Steel & Wire Co. shortly will start up two batteries of ovens at its Cleveland coke works that have been idle since 1933 to supply coke for the local and Youngstown district blast furnaces of the Steel Corporation.

Pig Iron

Shipments continue heavy except to automobile and parts foundries that have curtailed because of the General Motors strike. January shipments are expected to be slightly below those of December because of suspensions by these foundries. Consumers are rapidly taking out the iron still due against contracts placed before the late November price advance, and little of this iron will be left on the furnace books after Feb. 1. Quite a few sales in small lots are being made at the new prices.

Sheets

While miscellaneous demand continues active, backlogs are being slightly reduced as incoming tonnage is not equal to shipments. This is resulting in some easing up in the pressure for deliveries. However, many of the mills have about all the tonnage on their books that they can roll through March and some orders have been taken for definite shipment in April subject to the price prevailing at the time of delivery. One automobile manufacturer has inquired for some fill-in tonnage for early shipment.

There has been some curtailment of cold mill operations because of General Motors suspensions, but with this exception mills continue to operate at near capacity except where flood conditions are interfering.

Strip Steel

Demand is fair from miscellaneous consumers, but the volume is not large enough to fill in the gap caused by suspensions by automotive plants. However, mills have backlogs that will carry them well into March and are maintaining recent operations.

Bars, Plates and Shapes

Miscellaneous demand for merchant bars continues good. Consuming industries in this territory have been little affected by the General Motors strike, which, however, has resulted in a sharp slump in alloy bar orders. The deadline date of Jan. 31 for closing contracts for identified projects at fourth-quarter prices is stimulating orders for structural shapes and plates. The only sizable structural award is for 520 tons for the Reeves Mfg. Co., Dover, Ohio, taken by the Burger Iron Co. Pittsburgh Steamship Co., subsidiary of the United States Steel Corp., has asked for bids on two bulk freighters requiring approximately 12,000 tons of plates and shapes. These, if built, will be the first boats constructed for the ore and coal trade since 1930.

Iron Ore

The outlook in the Lake Superior iron ore industry during the coming shipping season indicates a movement in excess of 50,000,000 tons, or upward of 5,000,000 tons above last year and the largest shipments since 1929. Water shipments last year were 44,822,023 tons.

Stocks of ore at the opening of navigation, May 1, will be much lower than on that date for many years if consumption is maintained at around the present heavy rate. Stocks at furnaces and Lake Erie docks Jan. 1, were 31,402,148 tons, or 60,488 tons larger than on the same date a year ago. However, 1937 started with an ore consumption about 50 per cent greater than the rate of consumption at the start of 1936. During December the ore melt was 4,551,379 tons, compared with 3,100,530 tons in December, 1935. An increase this month over December is indicated.

Stocks at furnace yards and Lake Erie docks, May 1, last year, were 19,369,690 tons. If the melt is maintained at around the present rate during the next three months, consumption during the first four

months of this year will be over 17,500,000 tons, leaving a balance of less than 14,000,000 tons on furnace yards and docks, or nearly 5,550,000 tons less than on May 1, last year. Some consumers are likely to run short of certain grades of ore before 1937 shipments start and will be anxious to have cargoes shipped as soon as Lake freighters can start moving in the spring.

An earlier buying movement than for several years is predicted by some sellers. With increase in mining costs due to wage advances, higher ore prices are in prospect and some consumers doubtless would like to have the price question settled early in the season so that they will know what they will have to pay for their ore.



... Large construction projects pending.

... \$600,000,000 to be spent on jobs being estimated.

SAN FRANCISCO, Jan. 25—Though very few definite projects have been announced, preliminary estimates call for a sizable increase in construction work over 1936. National, state and city projects in the Pacific Southwest will cost approximately \$600,000,000. Of this, nearly \$300,000,000 will be spent in Bureau of Reclamation construction work and \$50,000,000 in work by the Metropolitan Water District of Southern California. Outstanding among contemplated projects in the Pacific Northwest is the building of flood control improvements on the Puyallup River near Tacoma, Wash. Early plans call for a reservoir at Mud Mountain and channel enlargements in the Puyallup River at a total estimated cost of \$5,000,000.

The Santa Cruz Oil Co. of San Francisco contemplates construction of wharves, storage tanks, and a production plant at Alameda, Calif., costing slightly over \$1,000,000.

Structural steel and cast iron pipe awards last week dominated the market. Columbia Steel Co. booked 800 tons of shapes required in buildings for the Insurance Company of America and Bethlehem Steel Co. took 338 tons to be used

in an underpass and approaches at Denver. An aggregate of 2476 tons was awarded.

Salt Lake City placed 1790 tons of 4 to 12-in. cast iron pipe with the Waterworks Equipment Co. This material will be used for a water supply system throughout the city.



... Bethlehem's operations will go higher.

... Steel output not yet affected by auto strikes.

BUFFALO, Jan. 26.—Indications are that before the end of the week, Bethlehem's Lackawanna plant will be operating 26 open hearths. Over the week-end 25 Bethlehem furnaces were in operation. Republic continues to operate six and Wickwire-Spencer Steel Co. two.

Blast furnace operation throughout the week was as follows: Bethlehem, five; Hanna Furnace Corp. three; Republic, two; Wickwire-Spencer, one and Tonawanda Iron Works, one.

Pig iron shipments are holding up even better the latter part of January than during first part. No indication of the automobile strike is yet apparent in either pig iron or steel production.

There is a lull in sizable fabricated structural and reinforcing bar contracting, though plenty of small tonnage is moving.



SUMTER, S. C., closes bids Feb. 2 for 9100 ft. of 6-in. and 3200 ft. of 2-in. for water system.

TWO HARBORS, Minn., plans pipe lines for water system and other waterworks installation, including pumping machinery and auxiliary equipment, with new reservoir at Fishermen's Point. Cost about \$135,000, of which \$70,000 will be arranged through municipal bond issue and \$65,000 by Federal grant. Leland Clapper is city engineer.

ROSE, N. Y., plans pipe lines for water system and other waterworks installation, including elevated steel tank and tower, pumping equipment and filtration plant. Cost close to \$120,000. Financing will be arranged through Federal aid. William S. Lozier, Inc., 10 Gibbs Street, Rochester, N. Y., is consulting engineer.

Charleston, Ind., closes bids Feb. 10 for 20,000 ft. of 6-in. and 16,000 ft. of 2-in. for water system; also for pumping and

chlorinator stations, 75,000-gal. elevated steel tank on 114-ft. steel tower, with alternate bid on 60,000-gal. elevated steel tank, and other waterworks equipment. Finch & Babcock, Century Building, Indianapolis, are consulting engineers.

JACKSON COUNTY PUBLIC WATER DISTRICT No. 1, Grandview, Mo., care of John N. Maddin and Jerome Walsh, 1201 Bryant Building, Kansas City, Mo., attorneys and representatives, closes bids Jan. 30 for pipe for water system in area of about 33 sq. miles near Grandview. Entire project will cost \$325,000. Charles A. Haskine & Co., Finance Building, Kansas City, Mo., are consulting engineers.

Pulaski, Va., has authorized pipe lines for auxiliary water system in Warden Springs district, and other waterworks installation. Cost about \$69,000, of which \$39,496 will be secured through Federal aid.

WESTMINSTER, Colo., has authorized immediate call for bids on revised plans for pipe lines for water system and other waterworks installation, including pumping equipment. C. R. Coberly, 1441 Walton Street, Denver, Colo., is consulting engineer.

Chickasha Metropolitan Water District, Chickasha, Okla., plans about 52 miles of 24-in. for main water line from Saddle Mountain district; also three pumping stations for booster service along route, 20,000,000-gal. filtration plant and other waterworks equipment. Cost about \$2,565,000; of this amount \$1,412,000 will be secured through municipal bond issue, for which special election is being arranged, and remainder through Federal aid. Robert O. Bradley & Co., Chickasha, Okla., are consulting engineers.

Scottsbluff, Neb., closes bids Feb. 7 for about one carload for water system. Wayne Harrison is city engineer.

SOUTH GATE, Cal., will open bids Jan. 29 on 733 tons of 4 to 12-in. for a water supply project.

SALT LAKE CITY, Utah, has awarded 1790 tons of 4 to 12-in. for a water supply system to Waterworks Equipment Co.

Foundry Meeting at Birmingham, Feb. 25

BIRMINGHAM'S fifth joint foundry practice meeting will be held Feb. 25-26. The meeting is being sponsored by the local section of the American Society of Mechanical Engineers and the district chapter of the American Foundrymen's Association. Several hundred foundrymen from all parts of the South are expected to attend. Last year's registration was over 400. The general theme of the meeting will be sand, safety and sanitation.

J. T. MacKenzie, American Cast Iron Pipe Co., and **George R. Ozzley**, Alabama By-Products Corp. are general chairmen. Other committee chairmen are: Program, R. R. Deas, Jr.; registration, J. E. Getzen; publicity, Russell Hunt; attendance, H. G. Mouat; entertainment, J. B. Hayes; plant visitation and transportation, J. A. Woody.

Denver Metal & Machinery Co. has purchased Morse Brothers Machinery & Supply Co., and the new firm will be known as Morse Brothers Machinery Co., 2900 Broadway, Denver. The company furnishes mining and milling equipment, both new and used. President is Max Grimes.



... . . . NEW YORK

... New business surpasses that of any month in 1936, excepting November.

... Floods in Ohio Valley delaying shipments from plants in that area.

... Tin plate stocks being removed from warehouses that are in danger.

NEW YORK, Jan. 26. Orders for finished steel continue to come to district sales offices in surprisingly good volume. The totals thus far in January indicate that some companies will do better this month than in any month of 1936 excepting December. Moreover, business is running at about twice the volume of January, 1936.

Pressure for deliveries has become more insistent upon those companies whose mills are not in the flood zone owing to the fact that some plants in the Ohio Valley are unable to make shipments. The Wheeling Steel Corp. appears to be, at this writing, the hardest hit of any steel company. No shipments will go out until the flood waters have receded, as railroads refuse to make the attempt to load cars in the Wheeling area. Production has also been interrupted at some of the Wheeling plants.

Tin plate producers whose warehouse stocks are in the path of the high waters have been making frantic efforts to obtain releases from tin plate users so that these stocks can be removed from the danger of being damaged by water. Some mills have been moving tin plate stocks to higher ground. Operations of some mills that are not flooded have been adversely affected by dirty water.

Discussion among steel sales people centers on the market conditions that will prevail when the floods have receded and the automobile strikes have been settled. It is believed that a rush of business will follow that will force steel companies to put on all possible pressure. Consumers are undoubtedly sensing this possibility, to-

gether with anticipated labor troubles in coal mines and steel mills, and are protecting themselves as fully as possible by placing steel orders now.

Pig Iron

Sales are in unchanged light volume as a consequence of extensive purchases before prices were advanced. Shipments continue brisk. Further evidence of an active district melt is contained in reports from jobbing foundries that operations are up following the holiday lull. Not all the tonnage placed with producers for fourth quarter delivery has as yet been cleaned up, although indications point to Jan. 31 as the deadline. Currently, shipments are also going forth against contracts placed this quarter. Increasing interest is shown in foreign inquiry coming into this market, assertions being made that acute shortages abroad will result in Europe's becoming a large buyer of American iron. China is reported to have purchased upward of 5000 tons last week, and Japan will likely re-enter the market for larger commitments. The recent decline in imported iron has been one factor responsible for increased volume of business placed with domestic furnaces. In conjunction with normal business expansion, rising scrap prices have aided the pig iron trade by leading to increased use of iron relative to the amount of scrap used in the melt. It is significant that sales of low silicon iron are now more plentiful, whereas demand for high silicon grades is tapering, indicating smaller proportion of scrap in foundry mixtures.

Reinforcing Steel

Demand for reinforcing bars is fair, and will probably continue at present levels or better for some time, due to work at the World's Fair, subway construction, the West Side elevated highway, the Midtown-Hudson tunnel, plans for which are now nearing completion, and other projects. A World's Fair job requiring 335 tons of bars was awarded to Bethlehem Steel Co. Jones & Laughlin Steel Service, Inc., received 280 tons for a section of the West Side highway. A drive along the East River from Grand to East 12th Street will require about 175 tons of bars and 3000 tons of sheet piling. Bids will be taken in about a month, and construction will commence as soon thereafter as possible.

U. S. Steel Earnings

\$50,525,684 in 1936

THE United States Steel Corp. last week declared the regular \$1.75 dividend on its preferred stock for the quarter ending Dec. 31, 1936, and announced a net income for the quarter of \$20,650,780, compared with \$5,326,417 for the same quarter last year, and \$13,636,177 for the previous quarter in 1936.

Net income available for dividends for the entire year of 1936 totaled \$50,525,684, compared with \$1,084,917 for 1935. Regular dividends on preferred stock were paid throughout the year, payments on this account totaling \$25,219,677, while the same amount was paid on preferred arrearages on Dec. 24, 1936, leaving available for further dividend payments a surplus of \$86,330, whereas the end of 1935 showed a \$6,120,705 deficit after payment during the year of only 2 per cent on preferred stock.

Total earnings of the corporation for the quarter and the year amounted to \$36,594,063 and \$112,380,082 respectively, compared with \$20,418,435 and \$60,434,318 for the same periods last year.

The dividend just declared will be paid Feb. 27, 1937, to stockholders of record Jan. 30, 1937. Arrearages on the preferred stock amounting to \$9.25 still remain to be paid.

Shipments of finished steel products for the quarter totaled 2,957,425 tons, compared with 2,030,076 tons for the final quarter of 1935. Shipments in 1936, aggregated 10,825,132 tons against 7,371,299 tons for all of 1935.



*...Awards of 1275 tons
—1530 tons in new
projects.*

AWARDS

New York, 280 tons, West side elevated highway, to Jones & Laughlin Steel Service, Inc.

Flushing, N. Y., 335 tons, World's Fair work, to Bethlehem Steel Co.

Willimantic, Conn., 100 tons, bridge, to Concrete Steel Co.

McComb, Ill., 280 tons, Teachers' College, to Joseph T. Ryerson & Son, Inc.

Proviso, Ill., 100 tons, high school, to Joseph T. Ryerson & Son, Inc.

Denver, 180 tons, underpass and approaches, to Colorado Builders Supply Co.

NEW REINFORCING BAR PROJECTS

PENDING

New York, 175 tons, East River drive; bids to be taken late in February.

New York, 1300 tons, Midtown Tunnel; bids late in February.

Detroit, estimates being made, merchandise mart.

Lemoore, Cal., 115 tons, high school buildings; bids Feb. 6.

A.F.A. Issues First Two of Code Series

THE American Foundrymen's Association has recently approved and published two tentative codes of recommended practices developed by its Industrial Hygiene codes committee. These codes are the first two in a series of some 25 codes being developed to assist in the standardization of dust eliminating methods and improvement of shop operating conditions in the foundry industry. The two codes which are now available are:

36-27—Tentative Code of Recommended Practices for Testing and Measuring Air Flow in Exhaust Systems. 13 pages, 12 figures.

36-28—Tentative Code of Recommended Practices for Grinding, Polishing and Buffing Equipment Sanitation. 24 pages, 30 figures.

Code 36-27 is prepared to aid in the standardization of the general type of instruments and technique employed in determining the volume and velocity of air flow in exhaust systems. It covers the application and testing technique for

pitot tubes, inclined and vertical manometer gages, revolving vane type anemometers and swinging vane type direct reading velocity meters. The thirteen figures contained in this code add greatly to the methods described.

Code 36-28 describes recommended practices for the ventilation of all grinding, polishing, buffing, scratch brushing or abrasive cutting-off wheels, and grinding or polishing straps or belts and is very similar to the new State of Illinois Buffing and Polishing Equipment Sanitation Law which many of the A.F.A. Industrial Hygiene codes committee members helped to draft. A series of definitions is followed by sections on applications for hood and branch pipe requirements, design of exhaust systems, testing exhaust systems and hood and inclosure design and minimum air velocity required. The numerous illustrations will be found very helpful in aiding plant engineers in designing effective equipment to meet plant requirements, especially for the smaller foundries.

Copies of these codes may be secured from the American Foundrymen's Association, 222 West Adams Street, Chicago, at \$2.00 per copy.

The personnel of the A.F.A. industrial hygiene codes committee which prepared these codes, is as follows:

Chairman, James R. Allan, International Harvester Co., Chicago.

J. L. Alden, Western Electric Co., Chicago.

R. J. Aldrich, Sloan Valve Co., Chicago.

F. H. Amos, International Harvester Co., Chicago.

E. E. Birkland, Crane Co., Chicago.

R. D. Brizzolara, American Steel Foundries, Chicago.

C. P. Guion, W. W. Sly Mfg. Co., Chicago.

E. O. Jones, American Foundrymen's Association, Chicago.

Carl F. Larsson, American Air Filter Co., Inc., Chicago.

C. B. Schnieble, Claude B. Schnieble Co., Chicago.

John F. Tobin, American Blower Corp., Chicago.

CONFEREES

L. M. Ellison, Ellison Draft Gauge Co., Chicago.

M. D. Pugh, Illinois Testing Laboratories, Chicago.

D. R. Hall, Gardner Machine Co., Beloit, Wis.

G. P. Ransom, Ransom Grinding Wheel Co., Oshkosh, Wis.

R. W. Young, Chas. H. Besly Co., Beloit, Wis.

F. A. Zink, Kirk & Bloom, Cincinnati.

Houghton Announces New Metal Cleaners

E. F. HOUGHTON & CO., 240 E. West Somerset Street, Philadelphia, recently announced an entirely new series of metal cleaners to be known as the Houghto-Clean, 100 Series. They replace the earlier series of the same name, and cover a wider range of operations.

The 100 series is made up of nine compounds covering light, medium and heavy duty cleaning. It is stated that they will do an efficient and rapid cleaning job in any operation where an alkaline cleaner is desired, and will remove all kinds of oils and greases, animal vegetable and mineral. One grade is specially designed for cleaning after carburizing.

This Houghto-Clean series is adaptable to tank, high pressure washing, steam gun, electrolytic and many other cleaning operations, and leave the metal surfaces in the proper condition for japping, galvanizing, electroplating, lacquering or any other type finishing. Each is a balanced cleaner, free rinsing and exceptionally efficient at low temperatures.

Bethlehem Announces 1937 Training Course

A 25-PAGE booklet has just been released announcing the training course of the Bethlehem Steel Co. for 1937 college graduates, and is being forwarded to personnel officers of colleges throughout the country.

"The requirements of the steel industry have broadened so in recent years as to increase the need for college training," states E. G. Grace, president of the company, in the introduction of the booklet. While there are non-college men who have acquired superior education and judgment through their own efforts, Mr. Grace believes that a college man has exceptional opportunities though "he must temper his approach to technical problems with practicality."

Established many years ago, Bethlehem's training course is discussed in detail in the booklet. Requirements for admission to the course are listed, as well as what will be expected of the student during the instruction period. The booklet is well illustrated with various views of Bethlehem's plants and constitutes a brief survey of the company's activities.

Forming and Forging

(CONTINUED FROM PAGE 31)

slitting and actual forging operations between the dies.

The top-suspended header slide extends clear to the back of the machine, and has great guided length to assure perfect slide alignment. This, it is stated, makes possible the production of extremely accurate, concentric and thin walled forgings, and the accurate hot punching of holes, resulting in appreciable savings in material and labor for drilling or boring.

The convenience with which dies and tools can be changed on these machines, it is pointed out, is a great advantage, not only on short runs where setup time must be prorated on small quantities, but also on close limit production where dies and tools must be replaced frequently to keep within forging tolerances. The heading tools are held securely in a slot type toolholder pocket with an adjusting wedge provided to facilitate the fine adjustment of tools.

Because of the capacity and speed of the machines, the flywheel is mounted on the crankshaft and delivers ample power to drive the machine. The motor is direct connected to the flywheel through a fiber pinion on the motor shaft which meshes with an integral gear on the clutch flywheel rim. The clutch provides the flexibility between the motor and the machine necessary for satisfactory operation and affords protection for the motor in case the machine is accidentally stalled. The motor is mounted on a bracket above the crankshaft housing, where it requires no additional floor space and is free from any accumulation of oil, scale or floor dirt.

The operating height has been increased to facilitate easier feeding by deepening the frame below the feed gap which also increases the rigidity of the machine.

An automatic lubricating system is built into the machine to provide the correct and proper lubrication with the advantages of decreased wear and increased durability. A flange around the bottom of the machine prevents any oil from discharging on to the floor.

A continuous motion rivet attachment can be supplied with the machines which, in addition to gen-

eral bolt heading and upsetting work, can also be used for making rivets, carriage bolts, track bolts, short length hexagonal or square head machine bolts, and other single blow forgings off the bar.

Hydraulic Clutches

The use of a hydraulic clutch mechanism for operating the machines is one of the recent developments in forging machine construction, giving the user the choice of a pneumatic or hydraulic clutch. A foot switch at the operator's position actuates a solenoid which opens a four-way valve, permitting oil under 800 lb. pressure to engage the clutch. The pressure is supplied by a hydraulic pump, direct connected to a small electric motor. The oil is introduced into a cylinder, which applies pressure direct to the friction plates, giving a smooth, cushioned starting action. The piston, cylinder and clutch housing are mounted on the flywheel and rotate with it.

When the machine has completed its cycle a cam on the end of the crankshaft trips a limit switch which interrupts the current to the solenoid, closing the four-way valve and disengaging the clutch. A band brake, which is spring set to stop the machine on open stroke, is released by hydraulic pressure before the clutch is engaged.

The pressure line installation is such that there are a minimum number of connections where leakage might develop, and any oil which might bypass the clutch piston is prevented from throwing on to the clutch plates or leaking out on the floor by an oil catcher within the clutch housing which returns any leakage to the supply tank.

Anchor Chain Forging

The hydraulic pump, motor and pressure regulating valve are mounted as a compact unit on the top of the oil reservoir at the side of the machine, with all electrical control equipment completely enclosed in a small cabinet.

Provisions of the hydraulically operated clutch mechanism eliminates the necessity of connecting the machine with the shop air line.

Forging heavy links for 4-in. anchor chains in the Boston Navy Yard for the largest size of die

lock chain made by the Navy Department was one of the interesting production jobs in forgings undertaken during the year and involves the use of both a drop hammer and a forging machine. Each half link weighs 75 lb. Both the male and female halves are made of alloy steel bar 3½ in. in diameter, cut to length. The male ends are tapered on the ends, bent, drop forged and trimmed, then heat treated. The female ends are bent and the holes are pierced in both ends at once, the metal displaced by the piercing punch providing stock which later in the closing of the links forms the stud between the sides of the link. The sides of the stud are not welded together nor are the halves welded together in the closing operation, as the joint is a mechanical one rather than a weld.

In assembling and closing the links the female half is heated to forging temperature. The male end is stood in the bottom die of the hammer with the points upward and the heated half is dropped down over it until the shoulders come together. The pieces are then laid over the impression in the bottom die and the closing is effected with a single blow of the hammer. The hot material is closed down around the lugs which have been formed on the cold end so that a perfect contact is formed throughout.

In assembling the complete chain after one length has been closed and trimmed it is put on edge in a slot which extends out in front of the die and a cold end is inserted in the finished link and placed in position to receive the hot end which is laid over and closed. The completed links are held suspended from an overhead crane and the assembly of the chain can be continued for any required length of chain.

The male halves of the links are forged and the half links closed on a steam drop hammer built by the Erie Foundry Co., Erie, Pa. This has a rated capacity of 10,000 lb., but an actual falling rate of over 14,000 lb.

The female half is formed and the holes pierced in the links on a 6-in. air clutch forging machine built by the Ajax Mfg. Co., Cleveland. This massive machine, weighing 257,000 lb., has increased die height and to assure the necessary rigidity has a heavy cross tie clamp above the die space.



FABRICATED STEEL

... *Awards in large volume at 58,500 tons compared with 12,950 tons last week.*

... *New projects decline to 14,150 tons from 26,900 tons a week ago.*

... *Plate lettings call for 3260 tons.*

STRUCTURAL AWARDS

NORTH ATLANTIC STATES

New York, 3160 tons, express highway viaduct, St. Clair Place to West 135th Street, for New York Central Railroad, to American Bridge Co.

New York, 550 tons, reconstruction of bridges over New York Central Railroad in Bronx, to American Bridge Co.

New York, 1025 tons, apartment building, 87th Street and West End Avenue, to Harris Structural Steel Co., Plainfield, N. J.

New York, 290 tons, building, 78 East 56th Street, to Bethlehem Fabricators, Inc., Bethlehem, Pa.

New York, 455 tons, school No. 108 in Bronx, to Weatherly Steel Co., Weatherly, Pa.

Syracuse, N. Y., 520 tons, horticultural building, to Smith & Caffrey Co., Syracuse.

Dutchess County, N. Y., 130 tons, highway bridge, to Phoenix Bridge Co., Phoenixville, Pa.

Odessa, N. Y., 185 tons, school building, to Genesee Bridge Co., Rochester, N. Y.

Corning, N. Y., 1100 tons, Chemung River bridge, to Lackawanna Steel Construction Corp., Buffalo.

Vineland, N. J., 100 tons, Kimball Glass Co. building, to Bethlehem Steel Co.

Johnstown, Pa., 400 tons, Hickory Street bridge, to Bethlehem Steel Co.

Philadelphia, 28,000 tons, electrification of main line, Pennsylvania Railroad from Paoli to Harrisburg; 14,000 tons to Bethlehem Steel Co., and remainder understood to have been divided among several companies, including American Bridge Co. and Lehigh Structural Steel Co.

Retreat, Luzerne County, Pa., 205 tons, hospital, to Wilkes-Barre Iron & Wire Co., Wilkes-Barre, Pa.

Washington County, Pa., 140 tons, building for Potter Lumber Co., to Guibert Steel Co., Pittsburgh.

Bridgeville, Pa., 170 tons, railroad bridge, to American Bridge Co.

Baltimore, 4600 tons, Glenn L. Martin airplane factory addition, to Bethlehem Steel Co.

Washington, 4300 tons, Apex building, to Fort Pitt Bridge Works Co.

SOUTH AND SOUTHWEST

Eckman, W. Va., 430 tons, highway bridge, to Virginia Bridge Co.

STRUCTURAL AWARDS

Sacramento, 100 tons, bridge over Castro Canyon, to Moore Dry Dock Co., San Francisco.

San Francisco, 800 tons, buildings for Insurance Co. of America, to Columbia Steel Co., Los Angeles.

Los Angeles, 252 tons, plant for Pacific Coast Borax Co., to Consolidated Steel Co.

Vernon, Cal., 115 tons, Swift & Co. plant, to Bethlehem Steel Co.

Kern County, Cal., 125 tons, bridge, to Minneapolis-Moline Power Implement Co.

Seattle, 125 tons, construction of wharf and slip, to Isaacson Iron Works.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

New York, 4500 tons, Midtown Tunnel; bids late in February.

Deer Isle, Me., 1200 tons, State bridge.

South Norwalk, Conn., 100 tons, post office.

Hartford, 700 tons, building extension, Hartford Electric Light Co.

New York, 400 tons, 13-story building for Rodney & Stuart Unz.

Yonkers, N. Y., 550 tons, mill building for Phelps-Dodge Corp.

Norristown, Pa., 260 tons, senior high school.

Armstrong-Westmoreland County, Pa., 600 tons, bridge; bids Feb. 5.

Warren County, Pa., 250 tons, bridge; bids Feb. 5.

West Pittsburgh, Pa., 500 tons, power house.

THE SOUTH

New Martinsville, W. Va., 400 tons, fertilizer plant, Peters Mfg. Co.

CENTRAL STATES

Allen County, Ohio, 120 tons, highway bridge; bids taken.

Detroit, 1000 tons, pump station and rock grit building for city.

Kalamazoo, Mich., 500 tons, power house.

Minneapolis, 260 tons, garage building for Dayton Co.

Cairo County, Ind., 300 tons, bridge.

Peoria, Ill., 500 tons, power house.

Atchison, Kan., 1500 tons, highway bridge; bids Feb. 8.

WESTERN STATES

San Diego, Cal., 400 tons, turbine room, etc., San Diego Consolidated Gas & Electric Co.

Los Angeles, 107 tons, Brand Boulevard bridge; bids opened.

FABRICATED PLATES

AWARDS

Flushing Meadow Park, N. Y., 220 tons, water pipe, to Alco Products, Inc., Dunkirk, N. Y.

Polson, Mont., 180 tons, 20-in. penstock lines, to Chicago Bridge & Iron Works.

Gallipolis, Ohio, 260 tons, United States Engineers barge, to Charles Hegewald Co., New Albany, Ind.

Toledo, 2600 tons, 48-in. welded pipe for water main, to Bethlehem Steel Co.

SHEET PILING

NEW PROJECTS

Buffalo, 750 tons, steel piling and bearing piles.

New York, 3000 tons, East River drive; bids late in February.



NON-FERROUS.

Lead stocks reduced 4500 tons during December.

Flood damage may expand market for copper.

Zinc shipments heavy; tin plate producers place tin commitments.

NEW YORK, Jan. 26.—Copper continued firm all week at 13.00c. a lb., Connecticut Valley. Demand was moderate, with aggregate monthly sales through last week equal to 47,676 tons. Outlook is for sustained business, to be aided by buying of manufactured products when flood replacements are undertaken. Cop-

per wire producers are expected to benefit particularly. Demand for refinery output is now mostly from producer-owned and some independent fabricating units. While refined production appears to be rising, consumption should readily absorb added volume. The foreign situation, which continued unstable last week, is at present improved,

The Week's Prices. Cents Per Pound for Early Delivery						
	Jan. 20	Jan. 21	Jan. 22	Jan. 23	Jan. 25	Jan. 26
Electrolytic copper, Conn.*	13.00	13.00	13.00	13.00	13.00	13.00
Lake, copper, N. Y.	13.12 1/2	13.12 1/2	13.12 1/2	13.12 1/2	13.12 1/2	13.12 1/2
Straits tin, spot, New York	51.12 1/2	51.15	51.00	...	50.00	50.37 1/2
Zinc, East St. Louis	6.00	6.00	6.00	6.00	6.00	6.00
Zinc, New York	6.35	6.35	6.35	6.35	6.35	6.35
Lead, St. Louis	5.85	5.85	5.85	5.85	5.85	5.85
Lead, New York	6.00	6.00	6.00	6.00	6.00	6.00

*Delivered Connecticut Valley; price 1/4c. lower delivered in New York. Aluminum, virgin 99 per cent plus 19.00c.-21.00c. a lb., delivered. Aluminum No. 12 remelt No. 2 standard, in carloads, 17.00c. a lb., delivered. Nickel, electrolytic, 35c. to 36c. a lb., base refinery, in lots of 2 tons or more. Antimony, Asiatic, 14.25c. a lb., New York. Quicksilver, \$88.50 to \$92.00 per flask of 76 lb. Brass ingots, commercial 85-5-5-5, 13.75c. a lb., delivered; in Middle West 1/4c. a lb. is added on orders for less than 40,000 lb.

From New York Warehouse Delivered Prices, Base per Lb.	
Tin, Straits pig	51.50c. to 52.50c.
Tin, bar	53.50c. to 54.50c.
Copper, Lake	13.75c. to 14.75c.
Copper, electrolytic	13.75c. to 14.75c.
Copper, castings	13.00c. to 14.00c.
*Copper sheets, hot-rolled	20.37 1/2c.
High brass sheets	18.25c.
Seamless brass tubes	20.87 1/2c.
*Seamless copper tubes	21.37 1/2c.
Brass rods	16.12 1/2c.
Zinc, slabs	7.00c. to 8.00c.
Zinc, sheets (No. 9), casks, 1200 lb. and over	10.75c.
Lead, American pig	7.00c. to 8.00c.
Lead, bar	8.00c. to 9.00c.
Lead, sheets, cut...	8.75c.
Antimony, Asiatic	15.00c. to 16.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum., No. 1 for remelting, 98 to 99 per cent	18.50c. to 20.00c.
Solder, 1/2 and 1/2	31.50c. to 32.50c.
Babbitt metal, commercial grades	25.00c. to 65.00c.

*These prices, which are also for delivery from Chicago and Cleveland warehouses, are quoted with 33 1/2 per cent allowed off for extras, except copper tubes and brass rods, on which allowance is 40 per cent.

From Cleveland Warehouse Delivered Prices per Lb.	
Tin, Straits pig	54.25c.

Tin, bar	
Copper, Lake	14.12 1/2c. to 14.25c.
Copper, electrolytic	14.12 1/2c. to 14.25c.
Copper, castings	13.87 1/2c. to 14.00c.
Zinc, slabs	6.50c. to 6.75c.
Lead, American pig	6.50c. to 6.60c.
Lead, bar	9.25c.
Antimony, Asiatic	16.50c.
Babbitt metal, medium grade	21.50c.
Babbitt metal, high grade	58.25c.
Solder, 1/2 and 1/2	33.00c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	9.87 1/2c.	10.62 1/4c.
Copper, hvy. and wire	9.75c.	10.25c.
Copper, light and bottoms	8.75c.	9.25c.
Brass, heavy	6.12 1/2c.	6.75c.
Brass, light	5.25c.	6.00c.
Hvy. machine composition	9.00c.	9.50c.
No. 1 yel. brass turnings	7.37 1/2c.	7.87 1/2c.
No. 1 red brass or compos. turnings	8.62 1/2c.	9.12 1/2c.
Lead, heavy	5.00c.	5.37 1/2c.
Sheet aluminum	13.25c.	14.75c.
Zinc	3.00c.	3.37 1/2c.
Cast aluminum	12.12 1/2c.	13.25c.

with export sales transacted this morning at about 12.65c. c.i.f., European ports, against 12.45c. yesterday.

Lead

Refined lead stocks underwent a reduction of 4537 tons during December to a total of 172,423 tons at Dec. 31, comparing with 222,306 tons at the end of 1935. The month's shipments were 51,646 tons, an increase of 1333 tons above November, while production rose 3254 tons to 47,085 tons. Total 1936 shipments amounted to 512,975 tons against 433,456 tons for 1935. Shipments to cable makers during the year aggregated 46,977 tons, or nearly 78 per cent above the 1935 shipments to this industry of 26,423 tons. Demand for pig lead quieted during the week, with most producers almost fully sold against January positions and largely booked on February needs. Recurrence of buying is not expected until next week when March order books will be opened. The price for lead continues firm and unchanged at 5.85c. a lb., St. Louis, and 6.00c., New York.

Zinc

Spelter shipments last week were the heaviest for a considerable period, the total having been about 7200 tons despite expectations that flood waters in some steel-making centers might hold up shipments to the galvanizing industry. In contrast to the week's deliveries, sales of prime Western and brass special grade aggregated not more than 3000 tons. Buying has been light for a fortnight or so, however, as earlier heavy commitments placed producers in a well-sold position. The tone of the market continues firm, with prices unchanged as based on 6.00c. a lb., East St. Louis. The London market is showing erratic tendencies, though price fluctuations there are insufficient to produce an impression on domestic quotations.

Tin

Prices in London reacted on Jan. 22 to the automobile strike and flood situation in this country, and stimulated buying as quotations receded. Reflecting this circumstance, tin futures at New York eased to a point where tin plate producers came into the market. Trading was substantial as the week closed, but demand had remained negligible until then. Spot metal quotations tended downward, reaching 50.00c. a lb. at New York yesterday, although today the price is 50.37 1/2c. Today's first session London standard prices are £226 5s. cash and £226 15s. three-months. The Eastern quotation is £228 12s. 6d.



IRON AND STEEL SCRAP

... Pittsburgh price off 50c, but Philadelphia and Chicago advance.

... Composite price for No. 1 steel 41c higher at \$18.83 a gross ton.

UNSETTLED by flood conditions, the Pittsburgh market has shown a decline of 50c. on heavy melting grades but, on the other hand, eastern Pennsylvania is \$1 higher on the strength of consumer purchases and moderate export activity, and Chicago is 75c. higher as a reflection of delays in shipments due to cold weather. The net result has been a 41c. advance in the composite figure to \$18.83 a gross ton, the highest level reached by steel-making scrap since Jan. 27, 1925.

Over the past month, England, Japan and Italy have come into the market for approximately 200,000 tons of No. 1, No. 2 and cast grades of scrap. As far as can be determined, \$18.50 to \$19 f.a.s. has been the top price paid for this material, and, more significant is that boat chartering activity indicates that much of this tonnage will leave here during the second quarter. The inference is, therefore, that brokers, particularly those in the East, are no longer looking forward to a sustained runaway market, but are booking a good supply of short orders at what they consider attractive price levels.

Pittsburgh

Following the largest transaction in the past six years, made two weeks ago and involving No. 1 and railroad heavy melting steel, the district's leading consumer is temporarily out of the market. Other melters have been holding up some shipments, and no buying of any consequence is expected for the next few weeks at least. Flood conditions have unsettled the market, as both buyers and sellers are directing their attention to matters other than the purchase of scrap. Consequently, No. 1 has slid off 50c. from last week's price, making it quotable at \$19 to \$19.50. Brokers are able to pick up fair tonnages of No. 1 at \$19 in order to cover shortages. No evidence is present, however, of any sharp downward trend in scrap prices.

Northern, 2000 tons each, and Missouri-Kansas-Texas, 1500 tons, which closed last week, went mostly to St. Louis bidders.

Cleveland

A Lorain mill has purchased a small tonnage of No. 1 steel at a reported price of \$18, and brokers are paying \$17.50 or more for scrap to ship against this order. This is the only recent purchase of steel-making scrap in northern Ohio. Brokers still are buying scrap for Youngstown delivery, but little for Cleveland. The market is firm, but apparently plenty of scrap is available at present prices to fill the current demand. Scrap production in the Detroit territory has been greatly reduced by the automobile strike, and this doubtless will be reflected in the February lists of the motor car companies to be issued this week.

Philadelphia

Purchases by a local user of tonnages of No. 1 and No. 2 steel have established the market at \$18.50 and \$17.50 respectively, the highest since 1925. Prevailing broker buying prices for export are unchanged at \$18 and \$17 for No. 1 and No. 2 respectively, delivered Port Richmond. Loading for export is not expected to commence until late next month, although one broker states he has accumulated a sufficient tonnage for one cargo.

Buffalo

A local plant closed last week for 25,000 to 30,000 tons of No. 1 and No. 2 steel and related grades. The price was \$18.50 and \$18.75 for No. 1 and \$17 and \$17.25 for No. 2, No. 1 busheling, new hydraulic compressed sheets, etc. Dealers able to supply 5000 tons got the higher price. The strength of the export market, with England and Germany heavy buyers of cast, and Italy and Germany buying No. 1 steel, is making for a scarcity in the Buffalo territory, and local dealers can hardly bring anything from east of Syracuse for local consumption.

New York

Steel mill grades continue to show unusual strength. Dealers are paying from 50c. to \$1 a ton more for No. 1 steel for domestic shipment, the price being \$14 to \$15 a ton. No. 2 steel is priced \$1 lower. Demand is active, and supplies fairly tight. Accumulations are in stronger hands than was the case last year. Demand for scrap for export is accelerating, although prior to three weeks ago little business was stirring in this direction.

Detroit

The flood situation in addition to strike uncertainty has tended further to restrict bidding on scrap until definite trends are noted. Some Ford scrap sold Monday brought slightly higher prices than did previous offerings a fortnight ago, and represented the usual premium over the market.

Iron and Steel Scrap Prices

PITTSBURGH

Per gross ton delivered to consumer:		
No. 1 hvy. mltng. steel.	\$19.00	\$19.50
No. 2 hvy. mltng. steel.	17.25	17.75
No. 2 RR. wrought	19.00	19.50
Scrap rails	20.00	20.50
Rails, 3 ft. and under	22.50	23.00
Comp. sheet steel	19.00	19.50
Hand. bundled sheets	18.00	18.50
Hvy. steel axle turn	17.50	18.00
Machine shop turn	14.00	14.50
Short shov. turn	14.00	14.50
Mixed bor. & turn	13.50	14.00
Cast iron borings	14.00	14.50
Cast iron carwheels	18.00	18.50
Hvy. breakable cast	15.00	15.50
No. 1 cast	17.50	18.00
RR. knuckles & cplrs.	24.50	25.00
Coll & leaf springs	24.50	25.00
Rolled steel wheels	24.50	25.00
Low phos. billet crops	25.00	25.50
Low phos. sh. bar	24.50	25.00
Low phos. punchings	24.00	24.50
Low phos. plate scrap	24.00	24.50
Steel car axles	23.00	23.50

CLEVELAND

Per gross ton delivered to consumer:		
No. 1 hvy. mltng. steel.	\$17.25	\$17.75
No. 2 hvy. mltng. steel.	16.25	16.75
Comp. sheet steel	16.50	17.00
Light bund. stampings	13.00	13.50
Drop forge flashings	16.50	17.00
Machine shop turn	12.00	12.50
Short shov. turn	12.00	12.50
No. 1 busheling	16.00	16.50
Steel axle turnings	15.00	15.50
Low phos. billet crops	22.00	22.50
Cast iron borings	12.50	13.00
Mixed bor. & turn	12.50	13.00
No. 2 busheling	12.50	13.00
No. 1 cast	18.50	19.00
Railroad grate bars	12.00	12.50
Stove plate	10.00	10.50
Rails under 3 ft.	22.00	22.50
Rails for rolling	20.00	20.50
Railroad malleable	18.00	18.50
Cast iron carwheels	18.50	19.00

PHILADELPHIA

Per gross ton delivered to consumer:		
No. 1 hvy. mltng. steel.	....	\$18.50
No. 2 hvy. mltng. steel.	....	17.50
Hydraulic bund. new	\$18.00	to 18.50
Hydraulic bund. old	16.00	to 16.50
Steel rails for rolling	18.00	to 18.50
Cast iron carwheels	18.50	to 19.00
Hvy. breakable cast	....	18.00
No. 1 cast	19.00	to 19.50
Stove plate (steel wks.)	15.00	to 15.50
Railroad malleable	18.00	to 18.50
Machine shop turn	12.00	to 12.50
No. 1 blast furnace	11.00	to 11.50
Cast borings	11.00	to 11.50
Heavy axle turnings	16.50	to 17.00
No. 1 low phos. hvy.	22.00	to 22.50
Couplers & knuckles	22.00	to 22.50
Rolled steel wheels	22.00	to 22.50
Steel axles	22.00	to 22.50
Shafting	22.00	to 22.50
No. 1 RR. wrought	17.00	to 17.50
Spec. iron & steel pipe	15.50	to 16.00
No. 1 forge fire	16.50	to 17.00
Cast borings (chem.)	12.00	to 13.00

CHICAGO

Delivered to Chicago district consumers:		
Per Gross Ton		
Hvy. mltng. steel	\$18.50	\$19.00
Auto. hvy. mltng. steel	16.50	17.00
Alloy free	16.50	17.00
Shoveling steel	18.50	19.00
Hydraul. comp. sheets	18.00	18.50
Drop forge flashings	14.50	15.00
No. 1 busheling	16.75	17.25
Rolled carwheels	20.50	21.00
Railroad tires, cut	20.50	21.00
Railroad leaf springs	20.50	21.00
Axle turnings	17.00	17.50
Steel coup. & knuckles	19.75	20.25
Coll springs	22.50	23.00
Axle turn. (elec.)	17.50	18.00
Low phos. punchings	22.00	22.50
Low phos. plates, 12 in.	22.00	22.50
Cast iron borings	10.50	11.00
Short shov. turnings	11.50	12.00
Machine shop turn	10.00	10.50
Rerolling rails	20.75	21.25
Steel rails under 3 ft.	20.50	21.00
Steel rails under 2 ft.	22.50	23.00
Angle bars, steel	20.50	21.00
Cast iron carwheels	18.50	19.00
Railroad malleable	20.50	21.00
Agric. malleable	17.00	17.50
Per Net Ton		
Iron car axles	20.50	21.00

Steel car axles	....	\$22.00	to \$22.50
No. 1 RR. wrought	....	16.75	to 17.25
No. 2 RR. wrought	....	16.50	to 17.00
No. 2 busheling, old	....	5.75	to 7.25
Locomotive tires	....	17.00	to 17.50
Pipes and flues	....	11.00	to 11.50
No. 1 machinery cast	....	16.00	to 16.50
Clean auto. cast	....	15.00	to 15.50
No. 1 railroad cast	....	15.00	to 15.50
No. 1 agric. cast	....	12.50	to 13.00
Stove plate	....	10.00	to 10.50
Grate bars	....	11.50	to 12.00
Brake shoes	....	12.00	to 12.50

BUFFALO

Per gross ton, f.o.b. consumers' plants:	....
No. 1 hvy. mltng. steel	\$18.50
No. 2 hvy. mltng. steel	17.00
Scrap rails	17.50
New hy. bndled sheet	17.00
Old hydraul. bundles	14.00
Drop forge flashings	17.00
No. 1 busheling	17.00
Hvy. axle turnings	11.00
Machine shop turn	12.50
Knuckles & couplers	20.50
Coll & leaf springs	20.50
Low phos. billet crops	20.50
Cast iron borings	12.25
Mixed bor. & turn	11.75
Steel car axles	20.50
Shov. turnings	12.25
Steel rails under 3 ft.	20.00
Cast iron carwheels	16.00
Railroad malleable	18.50
Chemical borings	13.00

BIRMINGHAM

Per gross ton delivered to consumer:	....
Hvy. melting steel	\$12.50
Scrap steel rails	12.50
Short shov. turnings	8.00
Stove plate	8.50
Steel axles	15.00
Iron axles	15.00
No. 1 RR. wrought	10.00
Rails for rolling	14.00
No. 1 cast	13.50
Tramcar wheels	13.00

ST. LOUIS

Dealer's buying prices per gross ton delivered to consumer:	....
Selected hvy. steel	\$16.50
Hvy. melting	15.50
No. 2 hvy. melting	14.50
No. 1 locomotive tires	15.50
Misc. stand.-sec. rails	16.75
Railroad springs	19.00
Bundled sheets	10.50
No. 2 RR. wrought	15.50
Stove plate	8.50
Cast bor. & turn	5.50
Rails for rolling	17.50
Machine shop turn	6.00
Heavy turnings	10.50
Steel car axles	21.00
Iron car axles	22.00
No. 1 RR. wrought	13.50
Steel rails under 3 ft.	17.50
Steel angle bars	16.75
Cast iron carwheels	16.00
No. 1 machinery cast	13.00
Railroad malleable	17.50
No. 1 railroad cast	13.25
Stove plate	11.25
Agric. malleable	12.50
Grate bars	11.00
Brake shoes	13.00

CINCINNATI

Dealers' buying prices per gross ton:	....
No. 1 hvy. mltng. steel	\$15.00
No. 2 hvy. mltng. steel	12.75
Scrap rails for mltng.	15.50
Loose sheet clippings	9.50
Bundled sheets	11.50
Cast iron borings	7.50
Machine shop turns	8.50
No. 1 busheling	12.00
No. 2 busheling	7.50
Rails for rolling	16.00
No. 1 locomotive tires	13.75
Short tails	18.75
Cast iron carwheels	14.75
No. 1 machinery cast	15.75
No. 1 railroad cast	14.75
Burnt cast	10.75
Stove plate	10.75
Agric. malleable	14.75
Railroad malleable	16.25

DETROIT

Dealers' buying prices per gross ton:	....
No. 1 hvy. mltng. steel	\$14.50
No. 2 hvy. mltng. steel	13.75
Borings and turnings	10.50
Long turnings	10.00
Short shov. turnings	11.25
No. 1 machinery cast	15.00
Automotive cast	16.00
Hydraul. comp. sheets	15.50
Stove plate	9.25
New factory bushel	14.25
Old No. 2 busheling	9.00
Sheet clippings	11.50
Flashings	14.00
Low phos. plate scrap	16.00

YOUNGSTOWN

Per gross ton delivered to consumer:	....
No. 1 hvy. mltng. steel	\$18.50
Hydraulic bundles	18.25
Machine shop turn	14.00

NEW YORK

Dealers' buying prices per gross ton:	....
No. 1 hvy. mltng. steel	\$14.00
No. 2 hvy. mltng. steel	13.00
Hvy. breakable cast	13.50
No. 1 machinery cast	15.00
No. 2 cast	12.00
Stove plate	10.50
Steel car axles	20.50
Shafting	17.00
Drop forge flashings	12.50
No. 1 RR. wrought	13.00
No. 1 wrought long	11.50
Spec. iron & steel pipe	12.00
Rails for rolling	15.50
Clean steel turnings	8.25
Cast borings	8.50
No. 1 blast furnace	7.00
Cast borings (chem.)	11.50
Unprepar. yard scrap	10.00

Add 25c. to 50c. to above quotations to secure North Jersey prices.

EXPORT

Dealers' buying prices per gross ton:	....
New York, delivered alongside barges	....
No. 1 hvy. mltng. steel	\$13.50
No. 2 hvy. mltng. steel	12.50
No. 2 cast	11.00
Stove plate	10.00
Rails (scrap)	13.50

PRICES ON FINISHED AND SEMI-FINISHED IRON AND STEEL

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

F.o.b. Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham. Prices at Duluth are \$2 a ton higher, and delivered Detroit \$3 higher.

Per Gross Ton

Rerolling \$34.00
Forging quality 40.00

Sheet Bars

F.o.b. Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open-hearth or Bessemer \$34.00

Skelp

F.o.b. Pittsburgh, Chicago, Youngstown, Buffalo, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared 1.80c.

Wire Rods

(No. 5 to 15/32 in.)

Per Gross Ton

F.o.b. Pittsburgh or Cleveland \$13.00
F.o.b. Chicago, Youngstown or Anderson, Ind. 44.00
F.o.b. Worcester, Mass. 45.00
F.o.b. Birmingham 46.00
F.o.b. San Francisco 52.00
F.o.b. Galveston 49.00

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

Base per Lb.

F.o.b. Pittsburgh 2.20c.
F.o.b. Chicago or Gary 2.25c.
F.o.b. Duluth 2.35c.
Del'd Detroit 2.35c.
F.o.b. Cleveland 2.25c.
F.o.b. Buffalo 2.30c.
Del'd Philadelphia 2.51c.
Del'd New York 2.55c.
F.o.b. Birmingham 2.35c.
F.o.b. cars dock Gulf ports 2.60c.
F.o.b. cars dock Pacific ports 2.75c.

Rail Steel

(For merchant trade)

F.o.b. Pittsburgh 2.05c.
F.o.b. Cleveland, Chicago, Gary or Moline, Ill. 2.10c.
F.o.b. Buffalo 2.15c.
F.o.b. Birmingham 2.20c.
F.o.b. cars dock Gulf ports 2.45c.
F.o.b. cars dock Pacific ports 2.60c.

Billet Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh 2.25c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham 2.30c.
Del'd Detroit 2.40c.
F.o.b. cars dock Gulf ports 2.65c.
F.o.b. cars dock Pacific ports 2.65c.

Rail Steel Reinforcing

(Straight lengths as quoted by distributors)

F.o.b. Pittsburgh 2.10c.
F.o.b. Buffalo, Cleveland, Youngstown, Chicago, Gary or Birmingham 2.15c.
F.o.b. cars dock Gulf ports 2.50c.
F.o.b. cars dock Pacific ports 2.50c.

Iron

F.o.b. Chicago 2.15c.
F.o.b. Pittsburgh (refined) 3.25c.

Cold Finished Bars and Shafting*

Base per Lb.

F.o.b. Pittsburgh 2.55c.
F.o.b. Cleveland, Chicago and Gary 2.60c.
F.o.b. Buffalo 2.65c.
Del'd Detroit 2.70c.
Del'd eastern Michigan 2.75c.

* In quantities of 10,000 to 10,000 lb.

Plates

Base per Lb.

F.o.b. Pittsburgh 2.05c.
F.o.b. Chicago or Gary 2.10c.
Del'd Cleveland 2.235c.
F.o.b. Coatesville or Spar. Pt. 2.15c.
Del'd Philadelphia 2.235c.
Del'd New York 2.33c.
F.o.b. Birmingham 2.20c.

F.o.b. cars dock Gulf ports 2.45c.

F.o.b. cars dock Pacific ports 2.60c.

Wrought iron plates, f.o.b. Pittsburgh 3.20c.

Floor Plates

F.o.b. Pittsburgh 3.60c.

F.o.b. Chicago 3.65c.

F.o.b. Coatesville 3.70c.

F.o.b. cars dock Gulf ports 4.00c.

F.o.b. cars dock Pacific ports 4.15c.

Structural Shapes

Base per Lb.

F.o.b. Pittsburgh 2.05c.

F.o.b. Chicago 2.10c.

Del'd Cleveland 2.235c.

F.o.b. Buffalo or Bethlehem 2.15c.

Del'd Philadelphia 2.25c.

Del'd New York 2.305c.

F.o.b. Birmingham (standard) 2.20c.

F.o.b. cars dock Gulf ports 2.45c.

F.o.b. cars dock Pacific ports 2.60c.

Sheet Piling

Base per Lb.

F.o.b. Pittsburgh 2.40c.

F.o.b. Chicago or Buffalo 2.50c.

F.o.b. cars dock Gulf or Pacific Coast ports 2.85c.

Coast ports 2.85c.

RAILS AND TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than

60 lb. per gross ton \$39.00

Angle bars, per 100 lb. 2.55c. to 2.70c.

F.o.b. Basing Points

Light rails (from billets) per gross ton \$38.00

Light rails (from rail steel) per gross ton 37.00

Base per 100 Lb.

Spikes 2.90c.

Tie plates, steel 2.10c.

Tie plates, Pacific Coast ports 2.20c.

Track bolts, to steam railroads 4.00c.

Track bolts, to jobbers, all sizes (per 100 counts)

65-5-5 per cent off list

Basing points on light rails are Pittsburgh, Chicago and Birmingham; on spikes and tie plates, Pittsburgh, Chicago, Portamouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; on the plates alone, Steelton, Pa., Buffalo; on spikes alone, Youngstown, Lebanon, Pa., Richmond, Va.

Sheets, Strip, Tin Plate, Terne Plate

Sheets

Hot Rolled

Base per Lb.

No. 10, f.o.b. Pittsburgh 2.15c.

No. 10, f.o.b. Gary 2.25c.

No. 10, del'd Detroit 2.35c.

No. 10, del'd Philadelphia 2.46c.

No. 10, f.o.b. Birmingham 2.30c.

No. 10, f.o.b. cars dock Pacific ports 2.70c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh 2.80c.

No. 24, f.o.b. Gary 2.90c.

No. 24, del'd Detroit 3.00c.

No. 24, del'd Philadelphia 3.11c.

No. 24, f.o.b. Birmingham 2.95c.

No. 24, f.o.b. cars dock Pacific ports 3.45c.

No. 24, wrought iron, Pittsburgh 4.50c.

Heavy Cold-Rolled

No. 10 gage, f.o.b. Pittsburgh 2.80c.

No. 10 gage, f.o.b. Gary 2.90c.

No. 10 gage, f.o.b. Detroit 3.00c.

No. 10 gage, f.o.b. del'd Philadelphia 3.11c.

No. 10 gage, f.o.b. Birmingham 2.95c.

No. 10 gage, f.o.b. cars dock Pacific ports 3.40c.

Light Cold-Rolled

No. 20 gage, f.o.b. Pittsburgh 3.25c.

No. 20 gage, f.o.b. Gary 3.35c.

No. 20 gage, del'd Detroit 3.45c.

No. 20 gage, del'd Philadelphia 3.56c.

No. 20 gage, f.o.b. Birmingham 3.40c.

No. 20 f.o.b. cars dock Pacific ports 3.80c.

Galvanized Sheets

No. 24 gage, f.o.b. Pittsburgh 3.40c.

No. 24, f.o.b. Gary 3.50c.

No. 24, del'd Philadelphia 3.71c.

No. 24, f.o.b. Birmingham 3.55c.

No. 24, f.o.b. cars dock Pacific ports 4.00c.

No. 24, wrought iron, Pittsburgh 5.15c.

Electrical Sheets

(F.o.b. Pittsburgh)

Base per Lb.

Field grade 3.20c.

Armature 3.55c.

Electrical 4.05c.

Special Motor 5.10c.

Special Dynamo 5.80c.

Transformer 6.30c.

Transformer Special 7.30c.

Transformer Extra Special 7.80c.

Silicon Strip in coils—Sheet price plus silicon sheet extra width extras plus 25c. per 100 lb. for coils.

Long Ternes

No. 24, unassorted 8-lb. coating f.o.b. Pittsburgh 3.70c.

F.o.b. Gary 3.80c.

F.o.b. cars dock Pacific ports 4.40c.

20, 20, 20, 20

No. 20, f.o.b. Pittsburgh 3.80c.

No. 20, f.o.b. Gary 3.95c.

No. 20, f.o.b. Birmingham 3.80c.

No. 20, f.o.b. cars dock Pacific ports 3.80c.

20, 20, 20, 20

No. 20, f.o.b. Pittsburgh 2.95c.

No. 20, f.o.b. Gary 3.05c.

No. 20, f.o.b. Birmingham 3.80c.

No. 20, f.o.b. cars dock Pacific ports, boxed 3.825c.

Tin Plate

Base per Box

Standard cokes, f.o.b. Pittsburgh district mill \$4.85

Standard cokes, f.o.b. Gary 4.95c

Above quotations practically the equivalent of previous quotations owing to new method of quoting, effective Jan. 1, 1937.

Special Coated Manufacturing Ternes

Manufacturing Ternes

Per Base Box

F.o.b. Pittsburgh \$4.15

F.o.b. Gary * 4.25

* Customary 7½ per cent discount in effect through 1936 discontinued as of Jan. 1, 1937.

Terne Plate

(F.o.b. Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C. \$10.00

15-lb. coating I.C. 12.00

20-lb. coating I.C. 13.00

25-lb. coating I.C. 14.00

30-lb. coating I.C. 15.25

40-lb. coating I.C. 17.50

Hot-Rolled Hoops, Bands, Strips and

Flats under 1/4 In.

Base per Lb.

All widths up to 24 in., Pittsburgh 2.15c.

All widths up to 24 in., Chicago 2.25c.

All widths up to 24 in., del'd Detroit 2.35c.

All widths up to 24 in., Birmingham 2.30c.

Cooperage stock, Pittsburgh 2.25c.

Cooperage stock, Chicago 2.35c.

Cold-Rolled Strip*

Base per Lb.

F.o.b. Pittsburgh 2.85c.

F.o.b. Cleveland 2.85c.

Del'd Chicago 3.13c.

F.o.b. Worcester 3.05c.

* Carbon 0.25 and less.

Cold-Rolled Spring Steel

Pittsburgh

and

Cleveland Worcester

Carbon 0.25-0.50% 2.85c. 3.05c.

Carbon .51-.75 3.95c. 4.15c.

Carbon .76-1.00 5.70c. 5.90c.

Carbon Over 1.00 7.75c. 7.95c.

Fender Stock

No. 14, Pittsburgh or Cleveland 3.10c.

No. 14, Worcester 3.50c.

No. 20, Pittsburgh or Cleveland 3.50c.

No. 20, Worcester 3.90c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)

To Manufacturing Trade

Per Lb.

Bright wire	2.60c.
Spring wire	3.20c.

Chicago prices on products sold to the manufacturing trade are \$1 a ton above Pittsburgh or Cleveland. Worcester and Duluth prices are \$2 a ton above, Birmingham \$3 above, and Pacific Coast prices \$9 a ton above Pittsburgh or Cleveland.

To the Trade

Base per Keg

Standard wire nails	\$2.25
Smooth coated nails	2.25

Base per 100 Lb.

Annealed fence wire	\$2.90
Galvanized fence wire	3.30
Polished staples	2.95
Galvanized staples	3.20
Barbed wire, galvanized	2.75
Twisted barbless wire	2.75
Woven wire fence, base column	63.00
Single loop bale ties, base column	55.00

Chicago and Anderson, Ind., mill prices are \$1 a ton over Pittsburgh base (on all products except woven wire fence, for which the Chicago price is \$2 above Pittsburgh); Duluth, Minn., mill prices are \$2 a ton over Pittsburgh except for woven wire fence, which is \$3 over Pittsburgh and Birmingham mill prices are \$3 a ton over Pittsburgh.

On wire nails, barbed wire and staples, prices at Houston, Galveston and Corpus Christi, Tex., New Orleans, Lake Charles, La., and Mobile, Ala., are \$6 a ton over Pittsburgh.

On nails, staples and barbed wire, prices of \$6 a ton above Pittsburgh are also quoted at Beaumont and Orange, Tex.

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

F.o.b. Pittsburgh only on wrought iron pipe.

Butt Weld

Steel	Wrought Iron	In.	Black Galv.	In.	Black Galv.
1/2	57	37	1/4 & 3/8	.+6	+26
1/2 to 3/4	60	44 1/2	1/2	.27	10 1/2
1/2	64 1/2	55	3/4	.32	16
1/2	67 1/2	59	1 & 1/4	.35	21
1 to 3	69 1/2	61 1/2	1 1/2	.39	23 1/2
		2		.38 1/2	23

Lap Weld

2	.62	53 1/2	2	.32 1/2	18
2 1/2 to 3	65	56 1/2	2 1/2 to 3 1/2	33 1/2	20 1/2
3 1/2 to 6	67	58 1/2	4 to 8	35 1/2	24
7 & 8	66	58 1/2	9 to 12	28 1/2	15
9 & 10	65 1/2	56			
11 & 12	64 1/2	55			

Butt Weld, extra strong, plain ends	
1/2	.55 1/2
1/2 to 3/4	42 1/2
1/2	.57 1/2
1/2	46 1/2
1/2	.62 1/2
1/2	54 1/2
1/2	.66 1/2
1/2	58 1/2
1 to 3	68

Lap Weld, extra strong, plain ends	
2	.60
2 1/2 to 3	64
3 1/2 to 6	67
7 & 8	66
9 & 10	65 1/2
11 & 12	64 1/2

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2 1/2 points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Seamless Steel Commercial Boiler Tubes and Locomotive Tubes

(Net base prices per 100 ft. f.o.b. Pittsburgh in carload lots)

	Cold	Hot
1 in. o.d.	13 B.W.G.	\$ 8.60
1 1/4 in. o.d.	13 B.W.G.	10.19
1 1/2 in. o.d.	13 B.W.G.	12.26
1 3/4 in. o.d.	13 B.W.G.	12.81
2 in. o.d.	13 B.W.G.	14.35
2 1/4 in. o.d.	13 B.W.G.	16.00
2 1/2 in. o.d.	12 B.W.G.	17.61
2 1/4 in. o.d.	12 B.W.G.	19.29
2 1/2 in. o.d.	12 B.W.G.	20.45

3 in. o.d.	12 B.W.G.	\$21.45	\$19.50
4 1/2 in. o.d.	10 B.W.G.	41.08	37.35
5 1/2 in. o.d.	11 B.W.G.	27.09	24.62
6 in. o.d.	10 B.W.G.	33.60	30.54
7 in. o.d.	10 B.W.G.	41.08	37.35
8 in. o.d.	9 B.W.G.	51.56	46.87
9 in. o.d.	7 B.W.G.	79.15	71.90

Extra for less-carload quantities:

25,000 lb. or ft. to 39,999 lb. or ft.	5%
12,000 lb. or ft. to 24,999 lb. or ft.	12 1/2%
6,000 lb. or ft. to 11,999 lb. or ft.	25%
2,000 lb. or ft. to 5,999 lb. or ft.	50%

Under 2,000 lb. or ft.

CAST IRON WATER PIPE

Per Net Ton

*6-in. and larger, del'd Chicago	\$50.00
6-in. and larger, del'd New York	48.00
*6-in. and larger, Birmingham	42.00
6-in. and larger, f.o.b. dock, San Francisco or Los Angeles	50.50
4-in. f.o.b. dock, Seattle	50.50
4-in. f.o.b. dock, San Francisco or Los Angeles	53.50
F.o.b. dock, Seattle	53.50

Class "A" and gas pipe, \$3 extra.
4-in. pipe is \$3 a ton above 6-in.

* Prices for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$41. Birmingham and \$49.50, delivered Chicago; and 4-in. pipe, \$44, Birmingham, and \$52.40 a ton, delivered Chicago.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:	70
Larger than 1/2 in.	65 and 10
Lag bolts	65 and 10
Flow bolts, Nos. 1, 2, 3, and 7 heads	65, 10 and 10
Hot-pressed nuts, blank or tapped, square	65 and 10
Hot-pressed nuts, blank or tapped, hexagon	65 and 10
C.p.c. and t. square or hex. nuts, blank or tapped	65 and 10
Semi-finished hexagon nuts, U.S.S. and S.A.E., all sizes	60, 20 and 5

Stove bolts in packages, nuts attached	72 1/2
Stove bolts in packages, with nuts separate	72 1/2 and 5
Stove bolts in bulk	81 1/2

On stove bolts freight is allowed to destination on 200 lb. and over.

Large Rivets

(1/2-in. and larger)

Per Net Ton

F.o.b. Pittsburgh or Cleveland	70
F.o.b. Chicago or Birmingham	70

Per Cent Off List

F.o.b. Pittsburgh	70
F.o.b. Cleveland	70

F.o.b. Chicago and Birm'g'm.	70
F.o.b. Birmingham	70

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lbs. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller	50 and 10
Milled standard set screws, case hardened, 1 in. dia. and smaller	75

Milled headless set screws, cut thread 3/8 in. and smaller	75
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60

Upset set screws, cup and oval points	75
Milled studs	65

Alloy and Stainless Steel

Alloy Steel Blooms, Billets and Slabs

F.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem.

Base price, \$55 a gross ton.

Alloy Steel Bars

F.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade, base.....2.75c.

Delivered, Detroit2.90c.

S.A.E. Series Numbers	Alloy Differential per 100 lb.
2000 (1/2% Nickel)	\$0.25
2100 (2 1/2% Nickel)	0.35
2300 (3 1/2% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	3.80
3400 Nickel Chromium	3.20
4100 Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100 Chromium Spring Steel	base
6100 Chromium Vanadium Bar	1.10c.
6100 Chromium Vanadium	0.70
Spring Steel	0.70
Chromium Nickel Vanadium	1.40
Chromium Vanadium	0.85

These prices are for hot-rolled steel bars. The differential for most grades in electric turned steel is 50c. higher. The differential for cold-drawn bars 1/4c. per lb. higher with separate extras.

Blooms, billets and slabs under 4x4 in. or equivalent are sold on the bar base.

Slabs with a section area of 16 in. and 2 1/2 in. thick or over take the billet base. Sections 4x4 in. to 10x10 in. or equivalent carry a gross ton price, which is the net price for bars for the same analysis. Larger sizes carry extras.

Alloy Cold-Finished Bars

F.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.25c. base per lb. Delivered Detroit, 3.40c.

STAINLESS STEEL No. 302

(17 to 19% Cr, 7 to 9% Ni, 0.08 to 0.20% C.)

(Base Prices f.o.b. Pittsburgh)

Per Lb.

Forging billets	19.5c.
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IRON AND STEEL WAREHOUSE PRICES

PITTSBURGH

	Base per Lb.
Plates	3.40c.
Structural shapes	3.40c.
Soft steel bars and small shapes	3.30c.
Reinforcing steel bars	3.30c.
Cold-finished and screw stock:	
Rounds and hexagons	3.80c.
Squares and flats	3.80c.
Hot rolled strip incl. 3/16 in. thick, under 24 in. wide	3.50c.
Hoops	4.00c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.65c.
Galv. sheets (No. 24), 25 or more bundles	4.25c.
Hot-rolled sheets (No. 16)	3.25c.
Galv. corrug. sheets (No. 28), per square (more than 3750 lb.)	\$3.94
Spikes, large	3.25c.
<i>Per Cent Off List</i>	
Track bolts, all sizes, per 100 count	60
Machine bolts, 100 count	65-5
Carriage bolts, 100 count	65-5
Nuts, all styles, 100 count	65-5
Large rivets, base per 100 lb.	\$3.75
Wire, black, soft ann'l'd, base per 100 lb.	3.15c.
Wire, galv. soft, base per 100 lb.	3.55c.
Common wire nails, per keg	2.50c.
Cement coated nails, per keg	2.50c.

On plates, structural bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 9999 lb.

*Delivered in Pittsburgh switching district.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.45c.
Soft steel bars, rounds	3.35c.
Soft steel bars, squares and hexagons	3.50c.
Cold-fin. steel bars:	
Rounds and hexagons	3.95c.
Flats and squares	3.95c.
Hot-rolled strip	3.60c.
Hot-rolled annealed sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.65c.
Spikes (keg lots)	4.00c.
Track bolts (keg lots)	5.10c.
Rivets, structural (keg lots)	4.10c.
Rivets, boiler (keg lots)	4.10c.
<i>Per Cent Off List</i>	
Machine bolts	*65
Carriage bolts	*65
Lag screws	*65
Hot-pressed nuts, sq. tap or blank	*65
Hot-pressed nuts, hex. tap or blank	*65
Hex. head cap screws	60
Cut point set screws	75 and 10
Flat head bright wood screws	62 and 20
Spring cotters	55
Stove bolts in full packages	70
Rd. hd. tank rivets, 7/16 in. and smaller	57 1/2
Wrought washers	\$4.00 off list
Black ann'l'd wire per 100 lb.	\$4.05
Common wire nails, 15 kegs or more	2.70c.
Cement c't'd nails, 15 kegs or more	2.70c.

On plates, shapes, bars, hot-rolled strip and heavy hot-rolled sheets, the base applies on orders of 400 to 3999 lb. All prices are f.o.b. consumers' plants within the Chicago switching district.

*These are quotations delivered to city trade for quantities of 100 lb. or more. For lots of less than 100 lb., the quotation is 60 per cent off. Discounts applying to country trade are 70 per cent off, f.o.b. Chicago, with full or partial freight allowed up to 50c. per 100 lb.

NEW YORK

	Base per Lb.
Plates, 1/4 in. and heavier	3.65c.
Structural shapes	3.62c.
Soft steel bars, rounds	3.62c.
Iron bars, Swed. char-coal	6.75c. to 7.00c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	4.22c.
Flats and squares	4.22c.
Cold-rolled; strip, soft and quarter hard	3.57c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

Hoops	3.82c.
Bands	3.82c.
Hot-rolled sheets (No. 10)	3.57c.
Hot-rolled ann'l'd sheets (No. 24*)	4.22c.
Galvanized sheets (No. 24*)	4.82c.
Long terne sheets (No. 24)	5.55c.
Armco iron, galv. (No. 24*)	5.85c.
Toncan iron, galv. (No. 24*)	5.85c.
Galvannealed (No. 24*)	5.95c.
Armco iron, hot-rolled annealed (No. 24*)	5.30c.
Toncan iron, hot-rolled annealed (No. 24*)	5.30c.
Armco iron hot-rolled (No. 10†)	4.35c.
Toncan iron, hot-rolled (No. 10†)	4.35c.
Cold-rolled sheets (No. 20) less than 1000 lbs.	
Standard quality	4.85c.
Deep drawing	5.50c.
Stretcher leveled	5.50c.
SAE, 2300, hot-rolled	7.32c.
SAE, 3100, hot-rolled	5.72c.
SAE, 6100 hot-rolled, annealed	9.92c.
SAE, 2300, cold-rolled, annealed	8.30c.
SAE, 3100, cold-rolled, annealed	7.75c.
Floor plate, 1/4 in. and heavier	5.45c.
Standard tool steel	11.75c.
Wire, black, annealed (No. 9)	3.60c.
Wire, galv. (No. 9)	3.85c.
Tire steel, 1 x 1/2 in. and larger	4.11c.
Open-hearth spring steel	4.15c. to 10.15c.
Common wire nails, base per keg	\$3.70

Per Cent Off List
Machine bolts, square head and nut:

All diameters

Carriage bolts, cut thread:

All diameters

* No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

† 125 lb. and more.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.69c.
Bars, soft steel (rounds and flats)	3.59c.
Bars, soft steel (squares, hexagons, ovals, half ovals and half rounds)	3.74c.
Cold-fin. rounds, shafting, screw stock	4.19c.
Hot-rolled annealed sheets (No. 24)	4.29c.
Galv. sheets (No. 24)	4.89c.
Hot-rolled sheets (No. 10)	3.59c.
Black corrug. sheets (No. 24)	4.29c.
1/2 Galv. corrug. sheets	4.89c.
Structural rivets	4.44c.
Boiler rivets	4.44c.

Per Cent Off List

Tank rivets, 7/16 in. and smaller

Machin and carriage bolts, lag screws, fitting up bolts, bolt ends, plow bolts, hot-pressed nuts, square and hexagon, tapped or blank, semi-finished nuts; all quantities

65

* No. 26 and lighter take special prices.

PHILADELPHIA

	Base per Lb.
*Plates, 1/4-in. and heavier	3.30c.
Structural shapes	3.30c.
*Soft steel bars, small shapes, iron bars (except bands)	3.45c.
*Reinforc. steel bars, sq. twisted and deformed	3.21c.
Cold-finished steel bars	4.18c.
*Steel hoops	3.80c.
*Steel bands, No. 12 and 3/16 in. incl.	3.55c.
Spring steel	5.00c.
*Hot-rolled anneal. sheets (No. 24)	4.15c.
*Galvanized sheets (No. 24)	4.80c.
*Hot-rolled annealed sheets (No. 10)	3.40c.
Diam. pat. floor plates, 1/4 in.	5.25c.
Swedish iron bars	6.25c.

These prices are subject to quantity differential except on reinforcing and Swedish iron bars.

*Base prices subject to deduction on orders aggregating 4000 lb. or over.

† For 25 bundles or over.

† For less than 2000 lb.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	3.56c.
Soft steel bars	3.25c.
†Reinforc. steel bars	2.25c.
†Cold-finished steel bars	3.95c.
Flat-rolled steel under 1/4 in.	3.66c.
Cold-finished strip	3.25c.
Hot-rolled annealed sheets (No. 24)	4.31c.
Galvanized sheets (No. 24)	4.91c.
Hot-rolled sheets (No. 10)	3.41c.
Hot-rolled 3/16 in. 24 to 48 in. wide sheets	3.66c.
*Black ann'l'd wire, per 100 lb.	\$3.10
*No. 9 galv. wire, per 100 lb.	3.50
*Com. wire nails, base per keg.	2.45c.

Per Cent Off List

Machine and carriage bolts, small

Large

Nuts, 100 count

65 and 10

65

Outside delivery 10c. less.

*For 5000 lb. or less.

† Plus switching and cartage charges and quantity differentials up to 50c.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.65c.
Floor plates	5.40c.
Bars, rounds, flats and angles	3.55c.
Other shapes	3.70c.
Rail steel reinforc. bars	3.40c.
Hoops and bands, 3/16 in. and lighter	3.75c.
Cold-finished bars	4.15c.
Hot-rolled annealed sheets (No. 24) 3500 lb. or more	4.05c.
Galv. sheets (No. 24) 3750 lb. or more	4.07c.
Galvanized sheets (No. 24) over 3500 lb.	4.65c.
Hot-rolled sheets (No. 10)	3.50c.
Small rivets	55 per cent off list
No. 9 ann'l'd wire, per 100 lb. (1000 lb. or over)	\$2.88
Common wire nails, base per keg:	
Any quantity less than carload	3.04
keg	3.50
Chain, lin. per 100 lb.	8.35

Net per 100 Ft.

Seamless steel boiler tubes	2-in.	\$20.37
	4-in.	48.14
Lap-welded steel boiler tubes	2-in.	19.38
	4-in.	45.32

BUFFALO

	Base per Lb.
Plates	3.62c.
Struc. shapes	3.50c.
Soft steel bars	3.40c.
Reinforcing bars	2.75c.
Cold-fin. flats and sq.	4.00c.
Rounds and hex.	4.00c.
Cold-rolled strip steel	3.44c.
Hot-rolled annealed sheets (No. 24)	4.46c.
Heavy hot-rolled sheets (3/16 in., 24 to 48 in. wide)	3.72c.
Galv. sheet (No. 24)	5.00c.
Bands	3.72c.
Hoops	3.72c.
Heavy top-rolled sheets	3.47c.
Common wire nails, base per keg	\$3.00
Black wire, base per 100 lb. (2500-lb. lots or under)	4.10c.
(Over 2500 lb.)	4.00c.

BOSTON

	Base per Lb.
Channels, angles	3.75c.
Tees and zees, under 3"	4.00c.
H beams and shapes	3.77c.
Plates — Sheared, tank, and univ. mill, 1/4 in. thick and heavier	3.78c.
Floor plates, diamond pattern	5.58c.
Bar and bar shapes (mild steel)	3.75c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.90c. to 4.90c.
Half rounds, half ovals, ovals and bevels	

DETROIT

	Base per Lb.
Soft steel bars	3.44c.
Structural shapes	3.65c.
Plates	3.65c.
Floor plates	5.40c.
Hot-rolled annealed sheets (No. 24)*	4.34c.
Hot-rolled sheets (No. 10)	3.44c.
Galvanized sheets (No. 24)**	5.00c.
Bands and hoops	3.69c.
†Cold-finished bars	4.04c.
Cold-rolled strip	3.43c.
Hot-rolled alloy steel (S.A.E. 3100 Series)	5.79c.
Bolts and nuts, in cases,	65 per cent off list
Broken cases	60 per cent off
Quantity differential on bars, plates, structural shapes, bands, hoops, floor plates and heavy hot- rolled: Under 100 lb., 1.50c. over base; 100 to 399 lb., base plus .50c.; 400 to 3999 lb. base; 4000 to 9999 lb., base less .10c.; 10,000 lb. and over, less .15c.	
* Under 400 lb., .50c. over base; 400 to 3499 lb., base; 3500 lb. and over, base less .25c.	
** Under 400 lb., .50c. over base; 400 to 1499 lb., base; 1500 to 3749 lb., base less .20c.; 3750 to 7499 lb., less .40c.; 7500 lb. and over, less .60c.	

Prices delivered by truck in metropolitan Detroit, subject to quantity differentials covering shipment at one time.

Common wire nails, base per
keg \$2.75
Galvanized and hot-rolled annealed
may not be combined to obtain quantity
deductions.

MILWAUKEE

	Base per Lb.
Plates and structural shapes	3.56c.
Soft steel bars, rounds up to 8 in., flats and fillet angles	3.46c.
Soft steel bars, squares and hexagons	3.61c.
Hot-rolled strip	3.71c.
Hot-rolled annealed sheets (No. 24)	4.16c.
Galvanized sheets (No. 24)	4.76c.
Cold-finished steel bars	4.06c.
Structural rivets (keg lots)	4.21c.
Boller rivets, cone head (keg lots)	4.21c.
Track spikes (keg lots)	4.11c.
Track bolts (keg lots)	5.21c.
Black annealed wire (No. 14 and heavier)	4.16c.
Com. wire nails and cement coated nails 15 kegs and over	2.81c.

Per Cent Off List
Machine bolts and carriage
bolts, $\frac{1}{4}$ x 6 and smaller 65
Larger 65
Coach and lag screws 65
Hot-pressed nuts, sq. and hex.
tapped or blank (keg lots) 65

Prices given above are delivered
Milwaukee.
On plates, shapes, bars, hot-rolled
strip and heavy hot-rolled sheets,
the base applies on orders of 400 to
3999 lb. On galvanized and No. 24
hot-rolled annealed sheets the prices
given apply on orders of 400 to 1500
lb. On cold-finished bars the prices
are for orders of 1000 lb. or more of
a size.

ST. PAUL

	Base per Lb.
Mild steel bars, rounds	3.60c.
Structural shapes	3.70c.
Plates	3.70c.
Cold-finished bars	4.42c.
Hot-rolled annealed sheets, No. 24	4.30c.
Galvanized sheets, No. 24	4.90c.

On mild steel bars, shapes and
plates the base applies on 400 to 14,-
999 lb. On hot-rolled sheets, gal-
vanized sheets and cold-rolled sheets
base applies on 15,000 lb. and over.
Base on cold-finished bars is 1000
lb. and over of a size.

BALTIMORE

	Base per Lb.
Mild steel bars and small shapes	3.50c.
Structural shapes	3.60c.
Reinforcing bars	prices on application
Plates	3.60c.
Hot-rolled sheets, No. 10	3.45c.
Bands	3.50c.
Hoops	3.75c.
Special threading steel	3.60c.
Diamond pattern floor plates $\frac{1}{4}$ in. and heavier	5.60c.
Galvanized bars, bands and small shapes	6.00c.
Cold-rolled rounds, hexagons, squares and flats, 1000 lb. and more	4.15c.

On plates, shapes, bars, hot-rolled
strip and heavy hot-rolled sheets the
base applies on orders 400 to 3999 lb.

All prices are f.o.b. consumers'
plants.
For second zone add 10c. per 100 lb.
for trucking.

PACIFIC COAST

	Base per Lb.
Plates, tank and U. M.	3.75c. 4.00c. 3.95c.
Shapes, standard	3.75c. 4.00c. 3.95c.
Soft steel bars	3.85c. 4.00c. 4.10c.
Reinforcing bars, f.o.b. cars dock	
Pacific ports	2.725c. 2.725c. 3.725c.
Hot-rolled annealed sheets (No. 24)	4.65c. 4.60c. 4.85c.
Hot-rolled sheets (No. 10)	3.95c. 4.15c. 4.10c.
Galv. sheets (No. 24 and lighter)	5.25c. 5.05c. 5.35c.
Galv. sheets (No. 22 and heavier)	5.50c. 5.20c. 5.35c.
Cold finished steel	
Rounds	6.30c. 6.35c. 6.60c.
Squares and hexagons	7.55c. 7.60c. 6.60c.
Flats	8.05c. 8.10c. 7.60c.
Common wire nails—base per keg less carload	\$3.10 \$3.05 \$3.10

All items subject to differentials
for quantity.

CHATTANOOGA

	Base per Lb.
Mild steel bars	3.71c.
Iron bars	3.71c.
Reinforcing bars	3.71c.
Structural shapes	3.81c.
Plates	3.81c.
Hot-rolled sheets No. 10	3.66c.
Hot-rolled annealed sheets, No. 24*	3.56c.
Galvanized sheets No. 24*	4.16c.
Steel bands	3.91c.
Cold-finished bars	4.51c.

* Plus mill item extra.

MEMPHIS

	Base per Lb.
Mild steel bars	3.82c.
Shapes, bar size	3.82c.
Iron bars	3.82c.
Structural shapes	3.92c.
Plates	3.92c.
Hot-rolled sheets, No. 10	3.77c.
Hot-rolled annealed sheets, No. 24	4.67c.
Galvanized sheets, No. 24	5.27c.
Steel bands	4.02c.
Cold-drawn rounds	4.49c.
Cold-drawn flats, squares, hexagons	6.49c.
Structural rivets	4.25c.
Bolts and nuts, per cent off list	65
Small rivets, per cent off list	50

NEW ORLEANS

	Base per Lb.
Mild steel bars	3.70c.
Reinforcing bars	3.50c.
Structural shapes	3.80c.
Plates	3.80c.
Hot-rolled sheets, No. 10	3.85c.
Hot-rolled annealed sheets, No. 24	4.55c.
Galvanized sheets, No. 24	4.95c.
Steel bands	4.25c.
Cold-finished steel bars	4.55c.
Structural rivets	4.25c.
Bolts and nuts	per cent off list
Base on cold-finished bars is 1000 lb. and over of a size.	65
Base on cold-finished bars is 1000 lb. and over of a size.	50

REFRACTORIES PRICES

Fire Clay Brick

Per 1000 f.o.b. Works

High-heat duty, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	\$48.00
High-heat duty, New Jersey	58.00
High-heat duty, Ohio	43.00
Intermediate, Pennsylvania, Maryland, Kentucky, Mis- souri and Illinois	43.00
Intermediate, New Jersey	46.00
No. 1, Ohio	40.00
Ground fire clay, per ton	7.00
5 per cent trade discount on fire clay brick.	

Silica Brick

Per 1000 f.o.b. Works

Pennsylvania	\$48.00
Chicago District	57.00
Birmingham	48.00
Silica cement per net ton	8.50

5 per cent trade discount on silica
brick.

Chrome Brick

Per Net Ton

Standard f.o.b. Baltimore, Plym- outh Meeting and Chester	\$47.00
Chemically bonded f.o.b. Balti- more, Plymouth Meeting and Chester, Pa.	47.00

Magnesite Brick

Per Net Ton

Standard f.o.b. Baltimore and Chester, Pa.	\$67.00
Chemically bonded, f.o.b. Balti- more	57.00

Grain Magnesite

Per Net Ton

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	\$45.00
Domestic, f.o.b. Baltimore and Chester, in sacks	43.00
Domestic, f.o.b. Chewelah, Wash.	34.00

RAW MATERIALS PRICES

PIG IRON

No. 2 Foundry

F.o.b. Everett, Mass.	\$22.75
F.o.b. Bethlehem, Birdsboro, and Swedeland, Pa., and Sparrows Point, Md.	22.00
Delivered Brooklyn	24.27
Delivered Newark or Jersey City	23.39
Delivered Philadelphia	22.76
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Buffalo; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	21.00
F.o.b. Jackson, Ohio	22.75
Delivered Cincinnati	21.07
F.o.b. Duluth	21.50
F.o.b. Provo, Utah	18.50
Delivered San Francisco, Los Angeles or Seattle	23.00
F.o.b. Birmingham	17.38

* Delivered prices on southern iron for shipment to northern points are 38c. a ton below delivered prices from nearest northern basing point on iron with phosphorus content of .70 and over.

Malleable

Base prices on malleable iron are 50c. a ton above No. 2 foundry quotations at Everett, Eastern Pennsylvania furnaces, Erie and Buffalo. Elsewhere they are the same.

Basic

F.o.b. Everett, Mass.	\$22.25
F.o.b. Bethlehem, Birdsboro, Swedeland and Steelton, Pa., and Sparrows Point, Md.	21.50
F.o.b. Buffalo	20.00
F.o.b. Neville Island, Sharpsville and Erie, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago and Granite City, Ill.	20.50
Delivered Cincinnati	21.01
Delivered Canton, Ohio	21.76
Delivered Mansfield, Ohio	22.26
F.o.b. Jackson, Ohio	22.25
F.o.b. Provo, Utah	18.00
F.o.b. Birmingham	16.00

Bessemer

F.o.b. Everett, Mass.	\$23.75
F.o.b. Bethlehem, Birdsboro and Swedeland, Pa.	23.00
Delivered Boston Switching District	24.50
Delivered Newark or Jersey City	24.39
Delivered Philadelphia	23.76
F.o.b. Buffalo and Erie, Pa., and Duluth	22.00
F.o.b. Neville Island and Sharpsville, Pa.; Youngstown, Cleveland, Toledo and Hamilton, Ohio; Detroit; Chicago	21.50
F.o.b. Birmingham	22.50
Delivered Cincinnati	22.51
Delivered Canton, Ohio	22.76
Delivered Mansfield, Ohio	23.26

Low Phosphorus

Basing points: Birdsboro, Pa., Steelton, Pa., and Standish, N. Y.

\$25.50

Gray Forge

Valley or Pittsburgh furnace

\$20.50

Charcoal

Lake Superior furnace

\$23.50

Delivered Chicago

26.04

Canadian Pig Iron

Per Gross Ton

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	\$21.00
No. 2 fdy., sil. 1.75 to 2.25	20.50
Malleable	21.00
Basic	20.50
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	\$22.50
No. 2 fdy., sil. 1.75 to 2.25	22.00
Malleable	22.50
Basic	22.00

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload)

\$80.00

RAW MATERIALS PRICES

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%	\$26.00
50-ton lots 3-mo. shipment	24.00
F.o.b. New Orleans	26.00

Electric Ferrosilicon

Per Gross Ton Delivered

50% (carloads)	\$69.50
50% (ton lots)	77.00
75% (carloads)	126.00
75% (ton lots)	136.00

Silvery Iron

Per Gross Ton

F.o.b. Jackson, Ohio, 6.00 to 6.50%	\$24.50
For each additional 0.5% silicon up to 17%.	

50c. a ton is added. The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Bessemer Ferrosilicon

Per Gross Ton

10.00 to 10.50%	\$29.50
10.51 to 11.00%	30.00
11.00 to 11.50%	30.50
11.51 to 12.00%	31.00
12.01 to 12.50%	31.50
12.51 to 13.00%	32.00
13.01 to 13.50%	32.50
13.51 to 14.00%	33.00
14.01 to 14.50%	33.50
14.51 to 15.00%	34.00
15.01 to 15.50%	34.50
15.51 to 16.00%	35.00
16.01 to 16.50%	35.50
16.51 to 17.00%	36.00

Manganese 2 to 3%, \$1 a ton additional. For each unit of manganese over 3%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Other Ferroalloys

Ferrotungsten, per lb. contained W del. carloads	\$1.30
Ferrotungsten, lots of 5000 lb.	1.35
Ferrotungsten, smaller lots	1.40
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr per lb. contained Cr delivered, in carloads, and contract	10.00c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del. per lb. contained V	\$2.70 to \$2.90
Ferrocolumbium, per lb. contained columbium, f.o.b. Niagara Falls, N. Y.	\$2.50
Ferrocobaltitium, 15 to 18% Ti, 7 to 8% C, f.o.b. furnace carload and contract per net ton	\$137.50
Ferrocobaltitium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton	142.50
Ferrophosphorus, electric, or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton	58.50
Ferrophosphorus, electric, 24%, in carloads, f.o.b. Anniston, Ala., per gross ton with \$3 unitage, freight equalized with Nashville, Tenn.	75.00
Ferromolybdenum, per lb. Mo del.	95c.
Calcium molybdate, per lb. Mo del.	80c.
Silico spiegel, per ton, f.o.b. furnace, carloads	\$38.00
Ton lots or less, per ton	43.00
Silico-manganese, gross ton, delivered.	
2.50% carbon grade	85.00
2% carbon grade	90.00
1% carbon grade	100.00

Note: Spot prices are \$5 a ton higher except on 75 per cent ferrosilicon on which premium is \$10 a ton.

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, Bessemer, 51.50%	\$4.80
Old range, non-Bessemer, 51.50%	4.65
Mesabi, Bessemer, 51.50%	4.65

Mesabi, non-Bessemer, 51.50% 4.50

High phosphorus, 51.50% 4.40

Foreign Ore

Per Unit

Iron, low phos., copper free, 55

to 58% dry, Algeria 13.50c.

Iron, low phos., Swedish, aver-

age, 68.5% iron Nominal

Iron, basic or foundry, Swe-

dish, aver. 65% iron 10.00c.

Iron, basic or foundry, Rus-

sian, aver. 65% iron Nominal

Man., Caucasian, washed

52% 34c.

Man., African, Indian,

44-48% 25c to 30c.

Man., African, Indian,

49-51% 30c.

Man., Brazilian, 46% 25c to 30c.

Per Net Ton Unit

Tungsten, Chinese, wolframite,

duty paid delivered nominal

15.00 \$15.25 to \$15.50

Tungsten, domestic, scheelite

delivered, nominal 15.00

Per Gross Ton

Chrome, 45% Cr₂O₃, lamp, c.i.f.

Atlantic Seaboard (African) \$17.50

45 to 46% Cr₂O₃ (Turkish)

\$18.00 to 19.00

48% Cr₂O₃ (African) 20.50

48% min. Cr₂O₃ (Turkish)

20.00 to 21.00

Chrome concentrate, 50% and

over Cr₂O₃ c.i.f. Atlantic ports 22.00

52% Cr₂O₃ (Turkish) 23.00 to 24.00

48 to 49% Cr₂O₃ (Turkish) 20.00 to 21.00

FLUORSPAR

Per Net Ton

Domestic, washed gravel, 85-5,

f.o.b. Kentucky and Illinois

mines, all rail \$18.00 to \$19.00

Domestic, barge and

rail 18.50 to 19.50

No. 2 lump, 85-5, f.o.b. Ken-

tucky and Illinois mines 20.00

Foreign, 85% calcium fluoride,

not over 5% silicon, c.i.f.

Atlantic ports duty paid 23.00

Domestic No. 1 ground bulk, 95

to 98% calcium fluoride, not

over 2 1/2% silicon, f.o.b. Illi-

nois and Kentucky mines 35.00

FUEL OIL

Per Gal.

F.o.b. Bayonne or Baltimore

No. 3 distillate 4.25c.

F.o.b. Bayonne or Baltimore,

No. 4 industrial 3.75c.

Del'd Ch'go, No. 3 industrial 4.25c.

Del'd Ch'go, No. 5 industrial 3.90c.

Del'd Cleve'd, No. 3 distillate 6.00c.

Del'd Cleve'd, No. 4 industrial 5.75c.

Del'd Cleve'd No. 5 industrial 5.00c.

COKE AND COAL

Coke

Per Net Ton

Furnace, f.o.b. Connells-

ville, Prompt \$4.00 to \$4.25

Foundry, f.o.b. Connells-

ville, Prompt 4.50 to 5.75

Foundry, by - product,

Chicago ovens 9.00

Foundry, by - product,

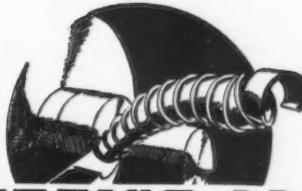
del'd New England 12.00

Foundry, by - product,

del'd Newark or Jersey

City 9.60 to 10.05

Foundry, by



THIS WEEK'S MACHINE ...TOOL ACTIVITIES...

... Automobile strikes having an effect on machinery business in Detroit area.

• • •

... Cincinnati machine tool production crippled by flood conditions

• • •

... Generally the outlook is favorable when present difficulties are out of the way.

Detroit

LABOR difficulties in General Motors plants are beginning to have a very adverse effect on the local machinery market. Obviously General Motors is not accepting any machinery or issuing any new orders, although there have been no hold-ups on the fabrication of machinery to be delivered several weeks hence. The psychological effect of the whole situation has been to prevent other possible buyers from making commitments for machinery at this time. Ford Motor Co. is the only important manufacturer in this area that is buying machinery right along, regardless of developments. Chrysler has several big buys under consideration, but is withholding action. Independent tool and die shops, although in need of equipment for the 1938 model season which is about to start, are also withholding action at this time. As a result, both orders and inquiries have fallen to the lowest point in two years.

Cincinnati

LOODS in this area have tended to retard industrial activity generally. Although not many of the tool factories were flooded, production was curtailed by employee distress and crippling of transportation and public utility facilities.

Demand during the early part of the week was brisk and indicated continued substantial buying, but as incoming mail became restricted, orders appeared to be easing. Until high water developed production was at about 85 per cent of capacity and the market was steadily improving in appearance.

Pittsburgh

ALTHOUGH inquiries are coming in at a steady rate, orders in the past week have slowed up somewhat. Some of this lethargy is attributed to a natural reaction following the heavy placement in December. Anticipation of a greater flood damage than actually occurred played its part in curtailing the volume of orders last week. More important, however, than these two facts, is the growing apprehension on the part of some customers that the automobile labor difficulties will resolve themselves into an extended conflict. Some orders for machine tools from companies supplying the automobile trade will undoubtedly be held up until the strike situation presents a clearer picture than at the present time. Meanwhile, aggregate business, which is miscellaneous in nature, is in satisfactory volume from dealers' standpoint and no drastic levelling off is expected.

Cleveland

ACTIVITY in the machine tool market is light as compared with December. The General Motors strike is held partly responsible for the scarcity of new business. However, the labor troubles have resulted in the holding up of deliveries in only a few cases. Little new inquiry is pending. The Bender Body Co., Cleveland, is purchasing sheet metal working machinery for equipping a new automobile trailer plant in Elyria. An advance of 8 to 10 per cent on vertical boring mills effective Feb. 1 has been announced by a leading Ohio builder. Representatives of a Japanese machinery house in New York were in

this city during the week looking for machine tools and not only announced their intention to make large purchases for this year, but expressed a willingness to buy machine tools for 1938 delivery. A leading screw machine manufacturer has restricted the export business that it will take by adopting a quota for foreign orders.

New York

DEMAND is holding up well. E. W. Bliss Co. and American Can Co. have been recent purchasers, while a small inquiry from the New York Central has been reported. Other railroads in this area are as yet inactive as concerns machine buying, although they have not been in the market for several years. Shipments are being held up from plants situated in the flood district, no freight or express being expected out of Cincinnati for a week or so. Deliveries are growing worse even for standard machines, and the usual complaints because of this difficulty are being received in all sales offices. There have been a few hold-orders here as a result of strikes in the automotive industry.

Chicago

SALES continue active. Planer prices are still at old levels, but builders are watching developments and quotations are being made effective for 10 days only. Agricultural implement manufacturers' plans are rapidly crystallizing while tractor plants are placing orders to meet requirements. Allis Chalmers Mfg. Co. may revive its project for a new tractor manufacturing building at Milwaukee. Railroad equipment shops are buying, as shown by Pullman-Standard Car Mfg. Co.'s purchase of a 62-in. and a 72-in. planer. Dealers' stocks of old tools are becoming depleted. Used punch presses are in active demand, with buyers paying within \$100 of the price of new equipment.

A new square hanging eaves trough, said to be attractive in appearance and exceptionally rigid and strong, has been placed on the market by the Milcor Steel Co., Milwaukee. Known as Kuehn's gutter, and designed by Louis Kuehn, Milcor's president, the new eaves trough may be installed, according to the company, as easily and simply as half-round eaves trough. Decorative flutings on side and bottom are among seven reinforcing features which are said to make the gutter far stronger, straighter and more easily handled and worked than is the ordinary product. The line is complete with lap joint, slip joint, mitres, hangers, ends and drops. A high back is also furnished for box gutter installation.



PLANT EXPANSION AND EQUIPMENT BUYING

... **Goodyear Tire & Rubber Co., Akron, Ohio, has let contract for a new mill at Jackson, Mich., costing close to \$3,000,000 with equipment.**

... **Glenn L. Martin Co., Baltimore, has plans for new aircraft unit to cost about \$2,000,000, including equipment.**

... **Babcock & Wilcox Tube Co., Beaver Falls, Pa., plans an expenditure of \$500,000 for an addition and equipment.**

◀ NORTH ATLANTIC ▶

Johns-Manville Corp., 22 East Fortieth Street, New York, manufacturer of building and roofing products, insulation materials, etc., has plans for expansion and improvements in branch plant at Manville, N. J., including three new one-story structures, with largest unit, 150 x 200 ft. A power house will be built to house present station and provide for considerable additional equipment, including oil-burning facilities. Entire project will cost close to \$1,000,000 with machinery. A. R. Fischer is general manager at Manville. Company has arranged for additional stock issue to total about \$10,000,000, part of fund to be used for purpose noted and for other expansion and improvements in its plants in various parts of country.

Domestic Dryer Corp., 227 West Seventeenth Street, New York, manufacturer of mechanical drying equipment, has leased a one-story building at McMechen, near Wheeling, W. Va., for new branch plant.

National Carbon Co., Inc., 30 East Forty-second Street, New York, manufacturer of electric batteries, electrodes, etc., has acquired about 175 acres on Duck River, about two miles from Columbia, Tenn., for new plant. Work will begin soon on initial one-story unit for production of electrodes. Cost over \$150,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 2 for 265 sandblasting helmets for Brooklyn Navy Yard (Schedule 9836).

Utica Products, Inc., Burrstone Road, Utica, N. Y., manufacturer of sheet metal enclosures and kindred sheet metal goods, has let general contract to E. C. Richards & Son, Inc., 2220 Douglas Crescent Street, for one-story addition. Cost close to \$45,000 with equipment.

Westvaco Chlorine Products Corp., 405 Lexington Avenue, New York, manufacturer of chemicals, plans new branch plant at Newark, Cal., for production of magnesium products and chemical compounds. Cost about \$1,000,000 with machinery. New works will be an extension to plant

of California Chemical Co., Newark, which is being acquired as an affiliated interest. Westvaco company is arranging for stock issue of 54,400 additional shares to provide for acquisition of California company and expansion.

Automatic Molded Products Corp., 37-19 Twenty-third Street, Long Island City, has leased space in building at 40-35 Twenty-first Street for expansion.

E. Leitz, Inc., 60 East Tenth Street, New York, manufacturer of microscopes, miniature cameras and other precision equipment, has leased about 15,000 sq. ft. floor space in building at 730 Fifth Avenue for plant, removing present works to new location and increasing capacity.

Commanding Officer, Ordnance Department, Picatinny Arsenal, Dover, N. J., asks bids until Feb. 11 for galvanized steel carriage bolts (Circular 443).

A. Fink & Sons Co., Inc., 810 Frelinghuyzen Avenue, Newark, N. J., meat packer, has plans for three-story and basement addition, 65 x 85 ft., and improvements in present plant. Cost over \$70,000 with equipment. Stadler Engineering Co., 114 Liberty Street, New York, is consulting engineer.

National Oil Products Co., Essex Street, Harrison, N. J., manufacturer of refined vegetable and animal oils, has acquired 52-acre tract at Cedartown, Ga., for new plant, consisting of 10 one-story buildings, with power house, machine shop and other units, including steel tank storage division. Cost close to \$1,000,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 2 for two motor-driven shapers (Schedule 9838); until Feb. 9, storage batteries (Schedule 9853) for Philadelphia Navy Yard.

Swift & Co., West Fourth Street, Williamsport, Pa., meat packers, will soon begin superstructure for one-story plant at Locust and Lycoming Streets, for which general contract recently was let to Jacob Gehron Co., Inc., 607 Cemetery Street.

Cost close to \$100,000 with equipment. Main offices of company are at Chicago.

Commanding Officer, Ordnance Department, Frankford Arsenal, Philadelphia, asks bids until Feb. 2 for one horizontal, wet, abrasive cutting machine (Circular 372), one automatic hone sharpening machine (Circular 382); until Feb. 3, one caliber 0.50, case finish end trim machine (Circular 365); until Feb. 4, 10 fifth-wheel shop trucks, 3 ft. wide and 6 ft. long overall, without couplers, each with capacity of 6000 lb. (Circular 379).

International Harvester Co., 606 South Michigan Avenue, Chicago, motor truck division, plans one-story factory branch, storage, distributing and service building, 100 x 260 ft., at Allentown, Pa. Cost over \$85,000 with equipment.

◀ NEW ENGLAND ▶

Commanding Officer, Ordnance Department, Springfield Armory, Springfield, Mass., asks bids until Feb. 11 for one hardness tester machine (Circular 125).

Eastern States Farmers' Exchange, Inc., 666 Summer Street, Boston, will take bids on general contract in February for new one-story plant, about 100,000 sq. ft. floor space, at Cambridge, Mass., for manufacture of commercial fertilizers. Cost close to \$500,000 with equipment. A. E. Baxter Engineering Co., 344 Delaware Avenue, Buffalo, is consulting engineer.

Board of Selectmen, Great Barrington, Mass., plans manual training department in new two-story high school. Cost about \$175,000. Financing will be arranged through Federal aid. Morris W. Maloney, 220 Dwight Street, Springfield, Mass., is architect.

Warren Telechron Co., Ashland, Mass., has let general contract to Irving P. Rocheford, 8 Arlington Place, Framingham, Mass., for one and two-story and basement addition, 120 x 125 ft., part of unit for storage and distribution, and remainder for manufacturing. Cost over \$150,000 with equipment. Fay, Spofford & Thorndike, 11 Beacon Street, Boston, are architects and engineers. Company is affiliated with General Electric Co.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 2 for one motor-driven broaching machine (Schedule 9804); copper-nickel alloy forgings (Schedule 9855) for Newport, R. I., Navy Yard.

Warren Brewing Co., North Chicopee, Mass., has let general contract to Daniel O'Connell's Sons, Inc., Holyoke, Mass., for one and three-story mechanical-bottling plant at Chicopee, Mass., 60 x 125 ft. Cost over \$100,000 with equipment. McClintock & Craig, 458 Bridge Street, Springfield, Mass., are architects and engineers.

◀ BUFFALO DISTRICT ▶

Hooker Electrochemical Co., Buffalo Avenue and Forty-seventh Street, Niagara Falls, N. Y., manufacturer of industrial chemicals, etc., has let general contract to Laur & Mack, 1400 College Avenue, for one-story addition. Cost close to \$50,000 with equipment.

Doebler Die Casting Co., Batavia, N. Y., plans expansion for production of Dowmetal or magnesium die castings, a new development of company, with installation of machinery to operate under 3000 to 4000 lb. pressure, and complete auxiliary equipment. New department is scheduled to ready for operation early in spring.

Hygrade Oil & Fuel Corp., 1070 Niagara Street, Buffalo, gasoline, fuel oils, etc., has let general contract to Boehm Brothers, Inc., 245 Colorado Avenue, for one-story addition for storage and distribution. Cost close to \$50,000 with equipment.

◀ WASHINGTON DIST. ▶

Purchasing and Contracting Officer, Holabird Quartermaster Depot, Baltimore, asks bids until Feb. 2 for drills, files, gages, reamers, taps, blowers, acetylene and oxygen welding and cutting equipment, grinding wheels, tool bits, cutters, screws, nuts, etc., comprising 117 items in all (Proposal 398-80); until Feb. 8 for

lathes, electric grinder, electric-operated presses, gear pullers, wheel pullers, grinders, wheel balancing stand, hoists, dynamometer, power blades, gasoline fire pots and other equipment (Proposal 398-73).

Glenn L. Martin Co., Middle River, Baltimore, manufacturer of airplanes and parts, has plans for new one-story unit, 300 x 500 ft., primarily for assembling, with headroom clearance of 40 ft. for construction of large clipper aircraft, with one-story structure adjoining, about 30,000 sq. ft. floor space; also several smaller units for parts production and other service. Cost close to \$2,000,000 with equipment. Taylor & Fisher, 1012 North Calvert Street, Baltimore, are architects.

General Purchasing Officer, Panama Canal, Washington, asks bids until Feb. 1 for 23,500 spring steel lock washers, galvanized iron or steel washers, tinner's rivets, steel rivets, galvanized steel deck bolts, brass rods, steel machine screws and other equipment (Schedule 3219).

Eastern Tar Products Corp., Lexington Building, Baltimore, has plans for new branch storage and distributing plant at Moncy Point, Norfolk, Va., with steel tank department of 2,000,000-gal. capacity, and other structures. Cost over \$60,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 2 for rivets, washers and burrs (Schedule 9807), one motor-driven cabinet-type single-cylinder surfacer (Schedule 9806), brass and steel bolts and nuts (Schedule 9798), two gasoline engine-generator power units (Schedule 9852), refrigerating plants and air-cooling units (Schedule 9811); until Feb. 5, two motor-driven rotary pumps and one motor-driven centrifugal pump (Schedule 9839); until Feb. 9, motor-driven milling machine (Schedule 9842), one motor-driven wood-working machine (Schedule 9849) for Eastern and Western yards.

Headquarters, Philippine Department, Office of United States Quartermaster, Manila, P. I., asks bids until Feb. 11 for one diesel engine-generating set (Circular 671-59).

◀ SOUTH ATLANTIC ▶

Ethyl-Dow Chemical Co., Midland, Mich., affiliated with Dow Chemical Co., same place, plans expansion and improvements in branch plant at Kure Beach on Cape Fear River, Wilmington, N. C., to include new processing equipment to increase raw sea water handling capacity from 50,000 to 100,000 gal. per min., and other equipment. Cost over \$200,000 with machinery. Award for dredging preparatory to building construction has been let to C. Walker Hodges Dredging Co., New Bern, N. C.

Charlotte Gary Beverage Co., Charlotte, N. C., has let general contract to J. B. Thomas, 1715 Jefferson Street, for one-story mechanical-bottling plant. Cost about \$40,000 with equipment.

Miami Aero Corp., Fort Lauderdale, Fla., J. Wesley Pape, president, has leased municipal airport for establishment of airplane service and repair works. An aircraft assembling plant is under consideration for handling large type planes.

◀ SOUTH CENTRAL ▶

Dixie Foundry Co., Cleveland, Tenn., manufacturer of stoves, ranges and parts, has filed plans for one-story addition, 110 x 200 ft., primarily for storage and distribution. Work is under way on two other units, one and two stories, for expansion in foundry division and japanning department. Entire project will cost close to \$100,000 with equipment.

International Harvester Co., 501 North Alexander Street, New Orleans, motor truck division, plans new factory branch, storage, distributing and service building on Poydras Street. Cost over \$75,000 with equipment. Main offices are at Chicago. J. O. Lambrecht is manager at New Orleans.

Director of Purchases, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Feb. 4 for about 450 miles of electrical conductor wire and cable for rural elec-

tric lines in Tennessee Valley area, with splicing material, armor and tie wire, etc.

Jefferson Lake Oil Co., Inc., New Orleans Bank Building, New Orleans, has secured property in Clemons Dam district, Brazoria County, Tex., for plant for sulphur production. Present sulphur works at Barba, Iberia Parish, La., will be removed to new site and capacity increased. Cost over \$85,000 with equipment.

Alabama Power Co., Birmingham, is arranging fund of \$3,700,000 for expansion and improvements in plants and properties, of which close to \$2,500,000 will be used for transmission and distributing lines for rural electrification, with power substation, station switching and service facilities.

◀ SOUTHWEST ▶

United States Engineer Office, Manufacturers' Exchange Building, Kansas City, Mo., asks bids until Feb. 5 for diesel engine-driven electric generating set (Circular 381); until Feb. 8, one steam engine-driven electric generating set (Circular 388).

Hill Packing Co., 231 North Jefferson Street, Topeka, Kan., meat packer, has approved plans for two one-story additions, 50 x 85 ft., and 40 x 50 ft. Cost close to \$40,000 with equipment.

Springfield Gas & Electric Co., Springfield, Mo., plans extensions and improvements in local steam-operated electric generating plant, including high-pressure boiler units and accessories, 12,500-kw. steam turbo-generator unit and auxiliary equipment. Cost over \$500,000.

Missouri Pacific Railroad Co., Missouri Pacific Building, St. Louis, has approved plans for addition to engine house and locomotive repair shops at Omaha, Neb. Cost over \$75,000 with equipment. Erection will be carried out by company forces. W. L. Wonson, first noted address, is assistant chief engineer.

Shipley Baking Co., Fort Smith, Ark., has plans for one-story plant, 50 x 170 ft., at Fayetteville, Ark. Cost over \$55,000 with ovens, conveying and other equipment.

Common Council, Anadarko, Ark., plans addition to municipal electric power plant for power supply for rural electrification lines, including installation of a 1000-hp. diesel engine unit, 700-kw. electric generator and auxiliary equipment. Robert O. Bradley Co., Chickasha, Okla., is consulting engineer.

Gulf Portland Cement Co., Houston, Tex., has asked bids on general contract for new cement mill on Houston ship channel, 300 x 500 ft., for wet process production. Storage and distributing buildings, power house and machine shop will be erected. Entire project will cost close to \$400,000. Howe & Wise, Scanlon Building, Houston, are engineers in charge of surveys.

Commanding Officer, Ordnance Department, San Antonio Arsenal, San Antonio, Tex., asks bids until Feb. 15 for one motor-driven screw-cutting lathe, one air-operated forging hammer, and one high-speed power hack saw complete with tools and accessories (Circular 8).

◀ OHIO AND INDIANA ▶

Timken Roller Bearing Co., 1025 Cleveland Avenue, Columbus, Ohio, has let general contract to E. Elford & Son, 555 South Front Street, for one-story addition. Cost over \$50,000 with equipment. Main offices of company are at Canton, Ohio.

Fox Furnace Co., Elyria, Ohio, manufacturer of heating furnaces and parts, has plans for one and two-story addition, about 55,000 sq. ft. floor space, in part for storage and distribution. Cost close to \$75,000 with equipment. Silsby & Smith, Turner Building, are architects. Company is a unit of American Radiator & Standard Sanitary Corp., New York.

Light Alloys Co., Painesville, Ohio, manufacturer of aluminum castings, etc., plans rebuilding part of plant recently destroyed by fire. Loss over \$50,000 with equipment.

Ohio Edison Co., Youngstown, plans expansion and improvements in local district

to cost about \$1,425,000, including improvements in steam-electric generating plant and installation of additional equipment, power substations, transmission lines and other structures. Approximately \$850,000 will be used for extensions and betterments in distributing lines and service facilities, including rural lines in Mahoning County. Samuel Stiles is general manager.

Bedford Distilling Co., Bedford, Ohio, has let general contract to Lowensohn Construction Co., 1740 East Twelfth Street, for one-story addition, 75 x 125 ft., for storage and distribution. Cost about \$55,000 with equipment.

Contracting Officer, Material Division, Army Air Corps, Wright Field, Dayton, Ohio, asks bids until Feb. 1 for one or two airplane maintenance stands (Circular 455).

Cliffside Brewing Co., 242 West McMechen Avenue, Cincinnati, has asked bids on general contract for three-story mechanical-bottling works, 96 x 120 ft. Cost over \$100,000 with machinery. Richard Griesser & Son, 64 West Randolph Street, Chicago, are architects.

Board of Directors, Indiana State Hospital, Logansport, Ind., Dr. C. L. Williams, superintendent, asks bids until Feb. 9 for extensions and improvements in steam power house for central heating service, including new boiler unit and accessories, pumping and other mechanical equipment. Cost about \$134,000. Walter Scholer, 1114 State Street, Lafayette, Ind., is architect; Bevington-Williams, Inc., Indiana Pythian Building, Indianapolis, is consulting engineer.

Coca-Cola Bottling Works, Inc., 858 Massachusetts Avenue, Indianapolis, has let general contract to William P. Jungclaus Co., 825 Massachusetts Avenue, for two-story addition to mechanical-bottling works, 40 x 100 ft. Cost over \$60,000 with equipment.

◀ MICHIGAN DISTRICT ▶

Goodyear Tire & Rubber Co., Akron, Ohio, has let general contract to Austin Co., Cleveland, for new one and multi-story mill, 150 x 650 ft., at Jackson, Mich., using part of local site recently acquired. Facilities will be installed for about 1500 operatives. Cost close to \$3,000,000 with machinery.

Tivoli Brewing Co., 10205 Mack Avenue, Detroit, has asked bids on general contract for one-story addition for storage and distribution. Cost over \$50,000 with equipment. Mildner & Eisen, Hammond Building, are architects and engineers.

Garden City Fan Co., Niles, Mich., manufacturer of mechanical draft fans and parts, plans rebuilding part of plant, including power house, recently destroyed by fire. Loss close to \$100,000 with equipment.

Eddy Paper Corp., Three Rivers, Mich., manufacturer of paperboard stocks, bristol board, etc., has let general contract to Miller-Davis Co., Kalamazoo, Mich., for mill addition. Cost close to \$100,000 with equipment.

Pontiac Motor Co., Pontiac, Mich., has let general contract to Austin Co., Cleveland, and Curtis Building, Detroit, for one-story foundry addition. Cost about \$60,000 with equipment.

Reid Products Co., Marine City, Mich., manufacturer of channels for motor car windows and other metal products, has approved plans for one-story addition, about 14,000 sq. ft. floor space, with equipment to double present capacity. Cost close to \$40,000 with equipment.

◀ WESTERN PA. DIST. ▶

Babcock & Wilcox Tube Co., Beaver Falls, Pa., manufacturer of seamless steel tubing and kindred steel specialties, plans one-story addition, 300 x 900 ft. Cost over \$500,000 with equipment. Company recently completed a one-story extension for immediate expansion. It is a subsidiary of Babcock & Wilcox Co., 85 Liberty Street, New York.

United States Engineer Office, Pittsburgh, asks bids until Feb. 1 for one diesel

engine-driven crawler-type convertible crane (Circular 239), one 130-gal. per min. vertical triplex single-acting power-driven pumping unit (Circular 265).

Lewis Foundry & Machine Co., Grove-ton, Pa., manufacturer of heavy steel castings, rolling mill machinery, etc., has begun plant expansion and improvements, to include several one-story additions for extensions in foundry, assembling and erection shops, pattern shop and other divisions. A new metallurgical research laboratory will be built. Company is a subsidiary of Blaw-Knox Co., Pittsburgh.

MIDDLE WEST ▶

Ahlberg Bearing Co., 321 East Twenty-ninth Street, Chicago, manufacturer of roller and other steel bearings, has leased one-story building at South Whipple and Forty-seventh Street, about 73,000 sq. ft. of floor space, and will remodel for new plant, expanding present capacity.

Signal Corps Procurement District, 1819 West Pershing Road, Chicago, asks bids until Feb. 2 for 200 reel axles (Circular 59) for telephone cable terminals (Circular 60).

Nubian Paint & Varnish Co., 1856 North LeClaire Avenue, Chicago, has plans for four-story addition, primarily for storage and distribution. Cost over \$125,000 with equipment. N. Ronneberg, Inc., 10 South La Salle Street, is engineer.

International Harvester Co., 606 South Michigan Avenue, Chicago, is considering one-story addition to branch plant at Fort Dodge, Iowa. Cost over \$60,000 with equipment. H. C. Kruse is branch manager at Fort Dodge.

Iowa Public Service Co., Fort Dodge, Iowa, plans addition to steam-electric generating plant at Waterloo, Iowa, including installation of high-pressure boiler units and accessories, turbo-generator and auxiliary equipment. Cost close to \$600,000 with machinery.

Bureau of Reclamation, Denver, asks bids until Feb. 8 for one crawler dragline excavator, traction-mounted, full-revolving, diesel engine-powered, convertible type, complete with power shovel attachments and accessories, for Riverton, Wyo., project (Specifications 874-D).

Common Council, Le Sueur, Minn., asks bids until Feb. 8 for extensions and improvements in municipal power plant, including new diesel engine-generator unit of 625 hp. rating, exciter and auxiliary equipment. C. A. Kampen is city clerk.

United States Engineer Office, Rock Island, Ill., asks bids until Feb. 10 for power, control and lighting system at lock and dam No. 21, Mississippi River, including gasoline-electric standby power unit, electric tow-haulage unit, hand-operated traveling bridge crane, central control station service power and lighting system feeders, sump pump and accessories, gaging stations, portable lighting units, storage yard lighting system, transformers and other equipment (Circular 119).

Aurora Pump Co., Aurora, Ill., manufacturer of pumping machinery and parts, is considering one-story shop addition.

Wisconsin Power & Light Co., Madison, Wis., will spend approximately \$1,500,000 during 1937 for expansion, including increase of 15,000-kw. transformer capacity at Fond du Lac substation and later increased capacity at Janesville.

PACIFIC COAST ▶

Liquid Carbonic Pacific Corp., 539 Mission Road, San Francisco, manufacturer of carbonating machinery, parts, etc., has let general contract to Louis C. Dunn, Inc., Monadnock Building, for new two-story plant for production of dry ice, carbonic gas and kindred products. Cost close to \$250,000 with equipment. Leland Rosener, 233 Sansome Street, is consulting engineer; Lieberman & Hein, 190 North State Street, Chicago, are mechanical engineers. Company is a subsidiary of Liquid Carbonic Corp., Chicago.

Pioneer-Flintkote Co., 5500 South Alameda Street, Vernon, Los Angeles, manufacturer of roofing and building products, corrugated box board specialties, etc., has

let general contract to C. L. Peck, H. W. Hellman Building, for one-story addition, about 50,000 sq. ft. floor space, primarily for corrugated board production. Cost over \$250,000 with machinery. Edward C. and Ellis W. Taylor, 803 West Third Street, are architects. Company is affiliated with Flintkote Co., New York.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Feb. 2 for two motor-driven coil-winding machines, and one armature and stator coil-former machine (Schedule 9817), 16 special type towing hawsers (Schedule 9831) for Mare Island Navy Yard; 250,000 ft. low-tension electric cable (Schedule 9823), one motor-driven, single-head punch and shear (Schedule 9818) for San Diego yard; until Feb. 5, two molding machines (Schedule 9834) for Puget Sound yard.

Christie Machine Works, 222 Howard Street, San Francisco, manufacturer of machinery and parts, has let general contract to George Wagner, 181 South Park Street, for new one-story plant. Cost about \$50,000 with equipment. Dodge A. Riedy, 821 Market Street, is architect; W. H. Ellison, Pacific Building, is mechanical engineer.

Wypenn Oil Co., 2902 Taylor Way, Tacoma, Wash., manufacturer of refined oils, has let general contract to Austin Co., Seattle, for one and three-story addition, 60 x 90 ft. Cost close to \$50,000 with equipment.

United States Engineer Office, Second District, Pittock Block, Portland, asks

bids until Feb. 11 for electric circuit breakers, metal-enclosed buses and auxiliary equipment for high-tension service (Circular 232).

Mefferd Brothers, Exeter, Cal., plan rebuilding fruit-packing plant recently destroyed by fire. Loss close to \$60,000 with conveyors, loaders and other mechanical-handling equipment.

◀ FOREIGN ▶

British-American Mfg. & Export Corp., Ltd., London, England, manufacturer of composition molded products, has plans for one-story branch plant in United States at Dover, Del. Initial unit will employ about 200 persons, and superstructure will begin early in February. Cost about \$125,000 with machinery. Walter Carlson, duPont Building, Wilmington, Del., is architect.

Ipoli Co., Ltd., Osijek, Jugoslavia, affiliated with Astra Co., Ltd., Zagreb, Jugoslavia, plans new oil refinery, for which a concession recently has been secured. It will include steel tank storage division, power house and other departments. Cost over \$600,000 with equipment.

Dunsward Iron & Steel Co., Ltd., Benoni, near Johannesburg, South Africa, plans expansion and improvements, including several new one-story units and installation of equipment. Cost over \$700,000 with machinery. G. P. Hemsley, 36 Old Queen Street, S.W., London, England, is engineer.

Ship Construction Gains in 1936

DURING 1936 merchant ship construction in the United States increased considerably over the low ebb of 1935 due to contracts for oil tankers and a large number of miscellaneous small craft, according to a statement by H. G. Smith, president, National Council of American Shipbuilders. At the end of the year, there were under construction 24 seagoing vessels of 1000 gross tons or over, with a total gross tonnage of 161,740, compared with 16 seagoing vessels totaling 92,074 gross tons at the end of 1935. Being built in private shipyards were 39 naval vessels with a total displacement tonnage of 160,794 against 46 naval vessels with a displacement of 182,024 gross tons at the end of 1935. According to official data taken from a Washington press dispatch in the *New York Herald-Tribune*, on Dec. 30, 1936, 95 naval vessels totaling 288,215 gross tons were either being constructed or had been appropriated for by Congress.

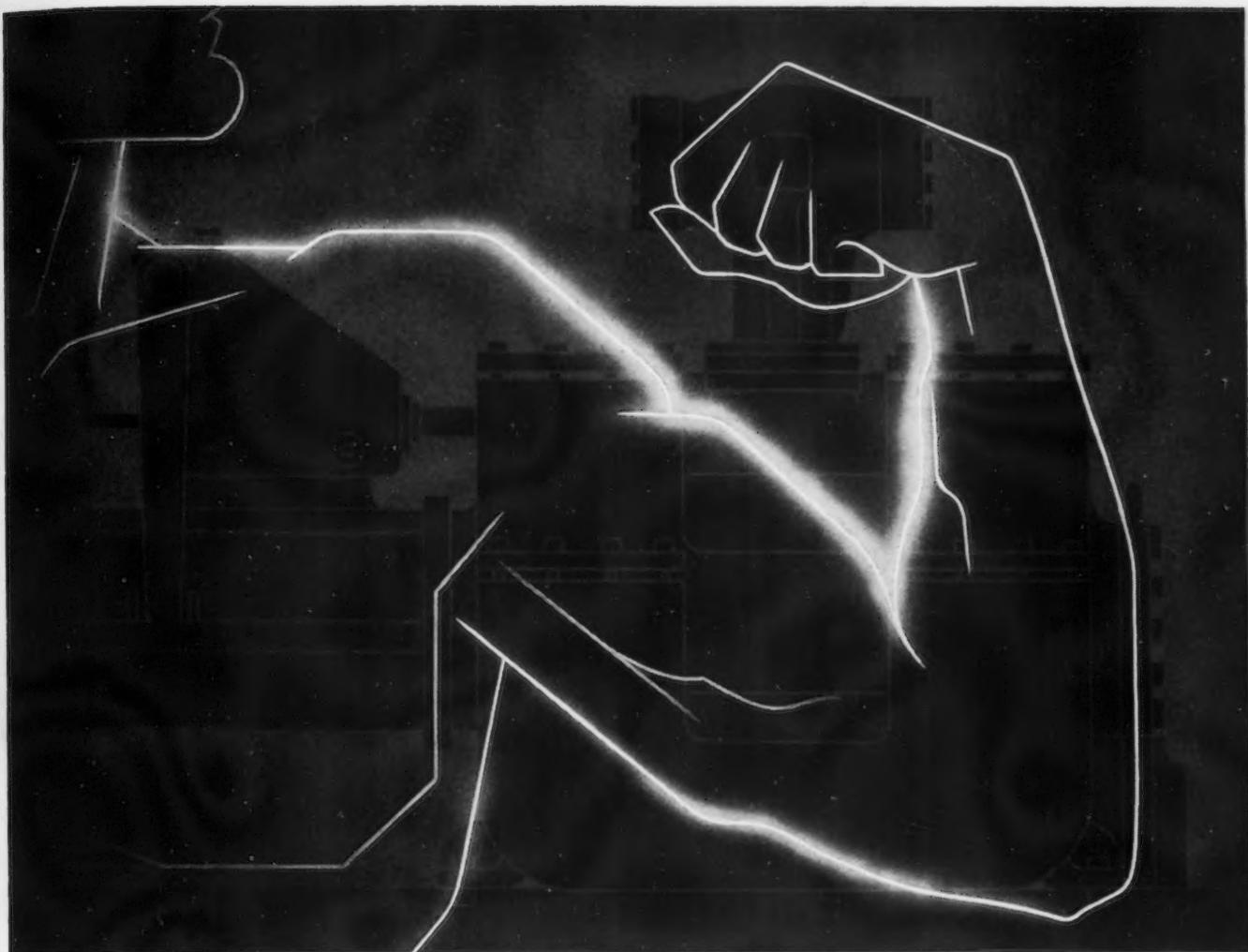
Taking into account both commercial and naval tonnage, Mr. Smith stated that employment in the industry is at the highest level of any period since the completion of the World War shipbuilding program, 27,176 workers being employed on new construction on Oct. 1, 1936.

"Notwithstanding this greater activity in the shipyards," Mr.

Smith continued, "there have been no orders placed during the year for any seagoing vessels of the cargo, combination or passenger type—a deplorable situation when it is realized that the cargo vessels in our foreign trade fleet will average about 17 years of age out of an average useful life of 20 years." A survey taken July 1, 1936, by the United States Shipping Bureau, ranks this country last as a builder of vessels for general cargo and passenger trade among the principle maritime nations.

Provision for replacement of this type vessel, so many of which are nearing obsolescence, is being undertaken by the Maritime Commission, created under the Merchant Marine Act of 1936. (THE IRON AGE, Sept. 17, 1936.)

Discussing the future outlook for the shipping industry Mr. Smith pointed out that much depends upon the success of the Maritime Commission in working out the problems imposed upon it, and the successful administration of the laws enacted by the last Congress affecting shipping. "The shipyards of the United States with their present facilities are in a position to handle any program of building likely to develop in peace times in meeting the requirements for new ships to maintain and buildup our shipping services. There are 67 available ways for the construction of seagoing vessels in existing operating shipyards and 30 more ways that could be made quickly available at small expense, in case of necessity."



SINEWS FOR SERVICE

IF THE service is tough — so are Moly irons and steels. Take slush pumps in the oil fields . . . driven continuously and operating under severe conditions.

Since no pump is better than its parts, many pump builders use Moly irons and steels for the vital parts . . . because they have proved their capacity to withstand the toughest going.

One manufacturer, for example, uses carburized Nickel-Moly (SAE 4615) for pump cylinders. It was selected primarily because it takes a case impervious to the abrasion of well cuttings; and pressure is always constant. Minimum distortion from heat-treating was also a factor. . . . Just one of many cases where Moly steel or iron has settled a difficult prob-

lem — to the mutual advantage of the manufacturer and the user of the product. From either standpoint, Moly steels and irons will prove well worth their investigation.

Our technical books, "Molybdenum in Steel" and "Molybdenum in Cast Iron," will be found of unusual interest to engineering and production heads in any industry using or producing ferrous products. A simple request brings either or both — and, if desired, puts your name on "The Moly Matrix" monthly mailing list. Our experimental laboratory facilities are available for the study of any special problem in alloy steel or iron. Climax Molybdenum Company, 500 Fifth Avenue, New York City.

PRODUCERS OF FERRO-MOLYBDENUM, CALCIUM MOLYBDATE AND MOLYBDENUM TRIOXIDE

Climax Mo-lyb-den-um Company

Power Transmission

(CONTINUED FROM PAGE 25)

ter the coupling; side thrust is eliminated on both shafts and bearings; and the shafts are free to float endwise freely in either direction. The coupling is constructed entirely of metal, proper lubrication is provided, and it is protected with a dust seal.

In the illustration shown an exploded view of this coupling is given. The left half has four os-

length, 4 in. high and 4 in. wide. It has a strong welded-frame shell and stainless steel collector rings. Shielded ball bearings are used to keep out dirt and insure long life, and special grease-packed bearings can be provided for use where continuous high-speed rotation is necessary.

General Electric also announces a new motor-starting switch with

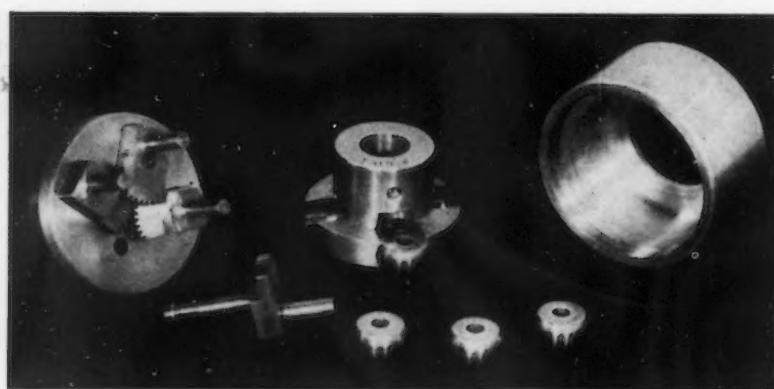


FIG. 38—Harris universal self-aligning flexible coupling.

cillating members fitted with pins at one end and having a gear sector cut in the other end. These segments oscillate and permit the pins to assume the necessary radial offset positions for parallel misalignment conditions. The rollers go on pins and fit into the machined recesses in the spider shown in the center. The machined recesses are radiused to take care of angular misalignment conditions. These couplings are made in horsepower ranges from 3 to 500 h.p., and in bore sizes of $\frac{3}{4}$ in. and up. Either half of the coupling can be the driving side.

Miscellaneous

General Electric Co. has developed a new Selsyn (self-synchronizing) device as a solution to many signaling, control and indication problems. Hundreds of these new units have recently been installed in steel mills where their sturdy construction meets admirably the severe service conditions incidental to continuous performance. The new unit is compact, measuring approximately $8\frac{1}{4}$ in. over-all in

overload protection, available for single-phase or direct current motors rated $\frac{1}{2}$ h.p. or less at 110 to 230 volts. This switch is compactly designed to fit into a conventional conduit box with standard tumbler-switch flush plate. It employs double break silver contacts and has a trip-free feature which prevents closing the contacts or holding them closed until the overload device has been reset after tripping. The use of a small Alnico permanent magnet in the direct current type permits the same rating on either alternating or direct current.

Infinite variable speed with constant speed motors is offered by the improved automatic pulley manufactured by Equipment Engineering Co. These units are made in bores from $\frac{1}{2}$ in. up to and including $1\frac{1}{2}$ in., in ratios varying from 2.6 to 1 to 2.8 to 1, and for motors ranging from $1/3$ to 3 h.p. In the Hi-Lo pulley the telescoping pulley faces turn freely on the spindle. The faces are held together by a spring on each side. These springs are not driving members,

but are used only to keep the pulley faces against the belt at all times. When the motor is started, the belt picks up the free pulley faces and revolves them until the cams on the back come in contact with tracks in the end-bells. These pulleys maintain constant speed at any set point no matter how the load varies. They are self-aligning, and automatically regulate belt tension to the load. As the load increases, the pulley faces are crowded harder and harder against the sides of the belt, and it is not until the motor begins to stall that the belt shows any signs of slipping. As the load begins to fall off, the belt tension eases, so that at no time is the belt tension greater than that required to move the load.

Making of Tin Plate Described in Booklet

UNDoubtedly one of the most interesting and technically informative descriptions of the manufacture of tin plate and tin cans in the United States has just been released by the International Tin Research and Development Council. Copies of this 144-page bulletin may be obtained free of charge from the American office of the council at 149 Broadway, New York. The information contained in the booklet was prepared by the staff of the Battelle Memorial Institute; not only is the presentation of great interest to the novice, but the scope of the industry is so ably covered that the booklet also may well become valuable as a reference work for those men directly connected with tin plate and can making. Profusely illustrated, the contents describe in detail the development of tin plate and can manufacture in the United States, describes current pack rolling and continuous mill procedure, annealing and normalizing, pickling, tinning (also terne plate), devotes considerable attention to methods of making cans and closures, and touches upon the future of the tin plate industry in the United States.

The next meeting of the National Silicosis Conference will be held Feb. 3. Committees making up the conference are preparing reports which will be presented and discussed at the meeting. It is the hope of the Department of Labor that the material will be available to state legislatures at an early date in order that they may use it in the preparation of legislation covering liability for occupational diseases.